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(Course in «KROK 1» English Subtest Training)

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ПЕРЕДМОВА

Реформи в системі охорони здоров'я, спрямовані на підвищення якості надання медичних послуг, потребують змін у медичній освіті та встановлюють нові вимоги до якості підготовки майбутніх лікарів. Підвищення вимог до професійної іншомовної підготовки цих фахівців призвело до включення до ліцензійних інтегрованих іспитів «Крок 1» субтесту із завдань англійською мовою. Підготовка студентів до успішного складання субтесту є важливою частиною освітнього процесу медичного університету і вимагає вдосконалення та підтримання необхідного рівня володіння англійською мовою, що можливо лише за умови постійної роботи та практики.

Посібник «Professional English for Medical Students(Course in "KROK 1" English Subtest Training)» створено для студентів III курсу саме з метою ретельної підготовки до субтесту з англійської мови. Посібник складається із 15 уроків та активізує знання з фізіології, морфології, хімічних складових тіла, серцево-судинної, травної, ендокринної та лімфатичної систем та їх патологій. Кожен з уроків містить неадаптований текст за певною тематикою та вправи спрямовані на засвоєння базової лексики та граматики. Ключові слова та терміни подані із транскрипцією що сприяє їх кращому засвоєнню. Граматичні завдання приділяють багато уваги розумінню логіки побудови питань та базуються на лексиці уроку.

Працюючи із текстом та виконуючи вправи студенти мають можливість засвоїти та поновити знання медичних термінів, словотворення, ознайомитись із поширеними скороченнями та абревіатурами, поглибити свої професійні знання англійською мовою.

Кожен з уроків містить також тренувальні вправи на розуміння власне завдань субкроку що сприяє розвитку аналітичного мислення та формує навички виконання екзаменаційних тестових завдань.

Особливої уваги заслуговують завдання на словотворення які дають розуміння логіки створення англійських медичних термінів та їх вживання відповідно до систем та процесів.

Наприкінці посібника подано перелік базових абревіатур та скорочень.

Посібник може також бути використаний у системі післядипломної освіти та з метою самостійного вивчення та вдосконалення медичної англійської.

Contents

UNIT 1

CHEMICAL COMPONENTS OF THE BODY

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the translation of the words in the table.

amino acid, *n*	[əˈmiːnəʊ 'æsɪd]	
adipose tissue, *n*	['ædɪpəus 'tɪʃuː]	
calcium, *n*	['kælsɪəm]	
carbon, *n*	['kɑːb(ə)n]	
catalyst, *n*	['kæt(ə)lɪst]	
double helix, *n*	['dʌbl 'hiːlɪks]	
fatty acid, *n*	['fætɪ 'æsɪd]	
glycerol, *n*	[ˈglɪs(ə)rɒl]	
hydrogen, *n*	['haɪdrədʒən]	
iron, *n*	['aɪən]	
lecithin, *n*	['lesɪθɪn]	
nitrogen, *n*	[ˈnʌɪtrədʒ(ə)n]	
nucleic acid, *n*	[njuːˈkliːɪk, 'æsɪd]	
nucleotide, *n*	[ˈnjuːklɪətaɪd]	
phosphate, *n*	['fɔsfeɪt]	
saccharide, *n*	[ˈsakərʌɪd]	
sodium, *n*	['səudɪəm]	
strand, *n*	[strænd]	

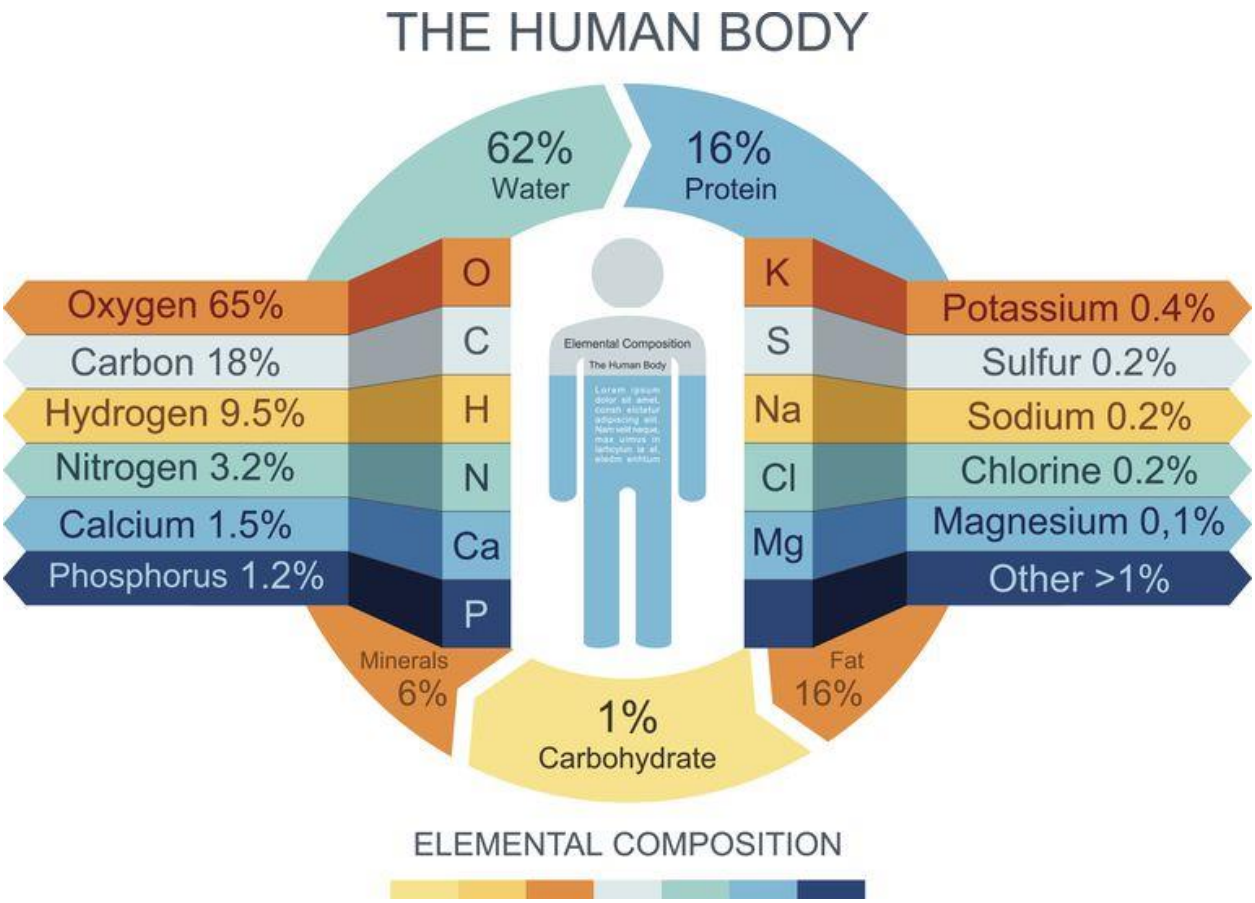
Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

1. A _____ is a chemical compound that contains phosphorus.
2. A _____ is a substance that causes a chemical reaction to take place more quickly.
3. _____ is an element which usually takes the form of a hard, dark grey metal.
4. _____ is another term for sugar in Biochemistry.

5. A _____ is a compound which consists of a nucleoside linked to a phosphate group and forms the basic structural unit of nucleic acids.
6. A _____ is a single thin length of something such as fiber especially as twisted together with others.
7. The term _____ _____ refers to the structure formed by double-stranded molecules of nucleic acids such as DNA.
8. _____ _____ is a layer of fat just beneath the skin and around various internal organs.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

1. There are no inorganic substances comprising carbon. ___
2. The principal role of carbohydrates is to provide energy. ___
3. Carbohydrates may be classified depending on whether they have one, two, several, or many saccharide units. ___
4. The body turns excess energy into fats, phospholipids and steroids. ___
5. Phospholipids and steroids are necessary to build cell membranes. ___
6. True fats are converted into substances used in the digestion. ___
7. Enzymes are essential for life because most chemical reactions in living cells would occur too quickly without them. ___
8. Protein synthesis in the cytoplasm is performed by DNA. ___



https://www.thoughtco.com/chemical-composition-of-the-human-body-603995

The human body contains chemicals that are constantly reacting with one another. There are two kinds of chemicals that make up the human body: inorganic and organic chemicals. Inorganic chemicals are primarily molecules that consist of one or two elements that are not carbon. Water (H2O) and oxygen (O2) are examples that are important for the human body to function, as are iron (Fe), calcium (Ca), and sodium (Na). One exception is carbon dioxide (CO2) - even though this contains carbon, it is inorganic. The other category of chemicals important to the body is organic chemicals, which contain the two elements hydrogen and carbon. These chemicals include fats, proteins, carbohydrates, and nucleic acids.

Carbohydrates are made up of carbon, hydrogen, and oxygen, and their main function is to be the body's energy source. There are four types of carbohydrates, all of which are forms of saccharide. They are monosaccharides, disaccharides, oligosaccharides, and polysaccharides. Monosaccharides are the simplest sugar compounds, because they only contain one sugar. Disaccharides comprise two monosaccharide compounds, while oligosaccharides contain anywhere between 3 and 20 monosaccharides. Finally, polysaccharides include thousands of monosaccharide compounds.

Like carbohydrates, lipids are also composed of carbon, hydrogen, and oxygen. Some lipids also contain phosphorus. Three types of lipids include true fats, phospholipids and steroids. True fats are made up of a molecule called glycerol, and between one and three fatty acid molecules. These fats are where the body stores excess energy produced by food in the form of calories. If a body does not use all of the calories, they are converted to fat and stored in the body's adipose tissues.

Another type of lipids is phospholipids, which are diglycerides that are bonded to a phosphate molecule. Unlike fats, phospholipids do not store energy. They are a part of a cell's structure; they form part of the cell membrane known as lecithin. They also are an integral part of the body's nervous system, in that they help to form the cell's myelin sheath that protects neurons. Like phospholipids, steroids form part of the cell membranes. But they also have other functions. One of their primary functions is that the liver processes them into bile salts, which are necessary for the digestion to process fats. In addition, steroids are also involved in hormones related to male and female reproductive organs.

Comprised of building blocks known as amino acids, proteins contain carbon, hydrogen, oxygen, nitrogen, and sometimes sulfur. One of the most important functions of proteins is their role as enzymes or catalysts. Enzymes accelerate chemical reactions in the body without additional energy, such as heat. There are specific enzymes for specific reactions. Because there are many thousands of different chemical reactions going on in the body at one time, there are many thousands of different enzymes.

There are two types of nucleic acid – DNA and RNA. Nucleic acids are large molecules that are made up of nucleotides. Each nucleotide has four components: sugar, phosphate group, and a nitrogenous base. DNA is a double strand of nucleotides that is in the shape of a twisted ladder, also called the double helix. DNA contains information on hereditary characteristics, and therefore is the body's genetic code. RNA is just a single strand. RNA's primary function is to carry out protein synthesis, and it performs this duty in the cytoplasm.

Exercise 4. Focus on grammar: Present Simple – positive and negative.

Present Simple is used to say that something happens all the time or repeatedly, or that something is true in general.

Look at these sentences and complete the rules.

Enzymes accelerate chemical reactions in the body without additional energy.

DNA contains information on hereditary characteristics.

Phospholipids do not store energy.

A body does not use all of the calories.

- In positive sentences with *I, we, you, they or plural nouns we use* _____
- In positive sentences with *he, she it or singular nouns we add* ____ *or* ____ *to the infinitive.*
- In negative sentences with *I, we, you, they or plural nouns we use* _____ *+ infinitive.*
- In negative sentences with *he, she it or singular nouns we use* _____ + *infinitive.*

Exercise 5. Fill in the gaps with the Present Simple of the verb in brackets.

Water 1_____ (comprise) approximately 60 to 75 percent of the human body. It 2_____ (act) as a solvent and as a lubricant. Besides it is vital in regulating the body's temperature. Many substances 3_____ (dissolve) in it, which 4_____ (allow) nutrients and other vital components to be transported throughout the body. Another important function is the elimination of waste. Water 5_____

(dissolve) materials that the body 6_____ (not need) and 7_____ (remove) them through the urinary system. Water is a lubricant, which 8_____ (mean) it 9_____ (prevent) friction between the various surfaces inside the body, such as bones and blood vessels. The temperature of water 10_____ (not change) quickly - it has to absorb a lot of heat or lose a lot of heat before the temperature 11_____ (increase) or 12_____ (decrease). This property 13_____ (enable) the body to stay at a constant temperature. In addition, water 14 _____ (do) an important cooling job for the body in the form of perspiration. When the body 15_____ (absorb) an excess amount of heat, sweat 16 _____ (form) on the skin, which 17_____ (allow) the heat to escape the body without damaging any cells.

Exercise 6. Fill in the table. Check the meaning of new words in a dictionary.

verb	noun	adjective
	absorption	absorbed, absorbing
		damaged, undamaged
		decreased, decreasing
	solution	dissolving, dissolved, undissolved soluble, insoluble
eliminate		eliminated
disable	ability disability	able disabled
		increased, increasing
lubricate		lubricated, lubricating
	prevention	preventable, unpreventable
	removal	removed
heat		hot

Exercise 7. Use the word given in capitals at the end of each line to form a word that fits in the gap in the same line.

1. The typical feature of carbon atoms is the _____ to bond to each other or to atoms of other elements.	ABLE
2. Water is the fundamental _____ for all biochemical processes in our bodies.	DISSOLVE
3. Among its vital functions, water acts as a _____ for the respiratory tract, digestive tract, and all tissues that are moistened via mucus.	LUBRICATE
4. Without sufficient phosphorus, body protein manufacture is _____, which eventually affects overall health.	DECREASE
5. The process of iron _____ is tightly regulated because the body does not posses any biochemical mechanisms for removing iron.	ABSORB
6. Sodium is _____ in the blood and plays a key role in maintaining blood pressure.	DISSOLVE
7. Omega 3 fatty acid can be used for the _____ of cognitive decline in older people.	PREVENT
8. When _____ of carbon dioxide is disrupted, this can lead to imbalances in body gases and acidity.	ELIMINATE

Exercise 8. Focus on grammar: Present Simple – questions.

Look at these questions and complete the rule.

What functions do lipids perform in our bodies?

What functions does water perform in our bodies?

- We make Present Simple questions with:
  question word + _____ *or* _____ + *subject* + _____.

Exercise 9. Make questions with these words. Use Present Simple.

Ask and answer the questions in pairs.

1. What / inorganic chemicals / consist of?
2. What elements / organic chemicals / contain?
3. How many saccharide units / each type of carbohydrates / contain?
4. What / enzymes / increase?
5. What / phospholipids / form?
6. Where / RNA / perform its function?
7. What / DNA / contain?
8. How / water / regulate the body's temperature?

Exercise 10. Medical vocabulary: combining forms.

Study the meaning of combining forms:

Combining form	mono-	di-	oligo-	poly-
Meaning	one	two	little, deficient	many

Match medical terms 1-10 to their definitions a-j.

1 monocellular, 2 dicyclic, 3 oligodontia, 4 polycystic, 5 oligosymptomatic, 6 oligodynamic, 7 diphase, 8 mononuclear, 9 monosymptomatic, 10 diplopia

a) having or involving a single kind of cell - **1 monocellular**
b) the perception of two images of a single object; called double vision – _____
c) active in very small quantities or at low concentrations - _____
d) manifested by only one marked symptom – _____
e) having two phases - _____
f) containing two usually fused rings in the structure of the molecule – _____
g) containing many cysts – _____
h) congenital absence of some of the teeth – _____
i) having only one nucleus – _____
j) having few or minor symptoms - _____

Supplementary Tasks

Exercise 1. Read the text and fill in the table.

Mineral Deficiencies

The term mineral deficiency means a condition where the concentration of any one of the minerals essential to human health is abnormally low in the body. Inorganic nutrients have a great variety of functions in the body.

Water, sodium, and potassium deficiencies are most closely associated with abnormal nerve action and cardiac arrhythmias. Sodium deficiency and water deficiency are the most serious and widespread deficiencies in the world. These deficiencies tend to arise from excessive losses from the body, as during prolonged and severe diarrhea or vomiting. Sodium deficiency and potassium deficiency also frequently result during treatment with drugs called diuretics.

When sodium levels in the body are low, water tends to enter cells, causing them to swell. When this occurs in the brain, it is referred to as cerebral edema. Cerebral edema is particularly dangerous because the brain is confined in the skull without room for expansion, and the swelling can lead to brain damage as the pressure increases within the skull. When the blood sodium levels drop gradually over time, symptoms can be very nonspecific and can include: headache, confusion or altered mental state, seizures, and decreased consciousness which can proceed to coma and death. Other possible symptoms include: restlessness, muscle spasms or cramps, weakness, and tiredness. Nausea and vomiting may accompany any of the symptoms.

Potassium is critical for the normal functioning of the muscles, heart, and nerves. It plays an important role in controlling activity of smooth muscle and skeletal muscle, as well as the muscles of the heart. It is also important for normal transmission of electrical signals throughout the nervous system within the body. Normal blood levels of potassium are critical for maintaining normal heart electrical rhythm. The effects of low potassium include may cause the following symptoms: muscle weakness, muscle aches, muscle cramps, and heart palpitations (irregular heartbeats).

Iodine deficiency is a global public health problem. It occurs in parts of the world with iodine-deficient soils, and results in goiter, which involves a relatively harmless

swelling of the neck, and cretinism, a severe birth defect. The only use of iodine in the body is for making thyroid hormone. However, since thyroid hormone has a variety of roles in development of the embryo, iodine deficiency during pregnancy results in cretinism in the newborn. Cretinism involves mental retardation, a large tongue, and sometimes deafness, muteness, and lameness.

Iron deficiency occurs due to periods of dietary deficiency, rapid growth, and excessive loss of the body's iron. The symptoms of iron deficiency are generally limited to anemia, and the resulting tiredness, weakness, and a reduced ability to perform physical work.

Calcium deficiency due to lack of dietary calcium occurs only rarely. However, calcium deficiency due to vitamin D deficiency can be found among certain populations. Vitamin D is required for the efficient absorption of calcium from the diet, and hence vitamin D deficiency in growing infants and children can result in calcium deficiency. A low blood level of calcium can make the nervous system highly irritable causing spasms of the hands and feet, muscle cramps, abdominal cramps, overly active reflexes, and so on. Chronic calcium deficiency contributes to poor mineralization of bones, soft bones (osteomalacia) and osteoporosis, and, in children, rickets and impaired growth.

Dietary deficiencies in the remaining inorganic nutrients tend to be rare.

Dietary phosphate deficiency is rare because phosphate is plentiful in plant and animal foods, but also because phosphate is efficiently absorbed from the diet into the body. Magnesium deficiency is uncommon, but when it occurs it tends to occur in chronic alcoholics, in persons taking diuretic drugs, and in those suffering from severe and prolonged diarrhea.

Zinc deficiency is rare, but it has been found in impoverished populations in the Middle East, who rely on unleavened whole wheat bread as a major food source. The symptoms of zinc deficiency include lack of sexual maturation, lack of pubic hair, and small stature. It may occur in adults with alcoholism or intestinal malabsorption problems. Low plasma zinc has been found in patients with alcoholic cirrhosis, Crohn's disease, and celiac disease. Experimental studies with humans have shown that the

signs of zinc deficiency are detectable after two to five weeks of consumption of the zinc-free diet. The signs include a rash and diarrhea. The rash occurs on the face, groin, hands, and feet.

Mineral	Cause of deficiency	Symptoms of deficiency
Calcium		
Iodine		
Iron		
Potassium		
Sodium		
Zinc		

Exercise 2. Read the text below and decide which answer A, B, C of D best fits each space.

Oxygen and Carbon Dioxide

We are continuously 1 _____ the gas known as oxygen - without it, we would die. Oxygen plays a vital role in 2 _____down nutrients such as glucose that need to be transported to various locations to 3 _____ the body with energy. This process is known as cell 4 _____. The energy produced through this process is

contained in a molecule that is called ATP, which stands for adenosine triphosphate. ATP can be thought of as the fuel 5 _____ for various cellular processes to occur throughout the body. In addition to producing ATP, this process also produces carbon dioxide. It is considered a waste product and like other waste products it must leave the body. So carbon dioxide is 6 _____. If carbon dioxide builds up in the body, it can 7 _____ the chemical balance in the body. This can cause acidosis, when fluid becomes too acidic, which can result in calcium 8 _____in the body's soft tissue. Carbon dioxide buildup in the body is toxic to the heart.

1	A exhaling	B ingesting	C inhaling	D absorbing
2	A cutting	B breaking	C putting	D bringing
3	A give	B produce	C convey	D provide
4	A perspiration	B respiration	C digestion	D separation
5	A required	B caused	C contained	D deficient
6	A inhaled	B assimilated	C discharged	D exhaled
7	A prevent	B interrupt	C disrupt	D construct
8	A deficiency	B toxicity	C disability	D deposits

Exercise 3. Translate into Ukrainian.

A 46-year-old female patient consulted a doctor about pain in the small joints of the upper and lower limbs. The joints are enlarged and shaped like thickened nodes. Serum test revealed an increase in urate concentration. This might be caused by a disorder in metabolism of:

A. Purines.

B. Carbohydrates.

C. Lipids.

D. Pyrimidines.

E. Amino acids.

_____

_____

Exercise 4. Translate into English.

При обстеженні чоловіка 45-ти років, що тривалий час перебував на рослинній дієті, виявлено негативний азотистий баланс. Яка особливість раціону стала причиною цього явища?

A. Недостатня кількість білків.

B. Надмірна кількість води.

C. Надмірна кількість вуглеводів.

D. Недостатня кількість жирів.

E. Недостатня кількість жирів і білків.

Exercise 5. Study the abbreviations and write their meaning in the table.

Abbreviation	Meaning
c/o	
DOB	
Dx	
FH	
H&P	
M/F	
NYD	
O/E	
PH	
SH	

UNIT 2

MORPHOLOGY OF CELLS

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the translation of the words in the table.

molecule, *n*	[ˈmɒlɪkjuːl]	
organelle, *n*	[ˌɔːgəˈnɛl]	
cytoplasm, *n*	[ˈsʌɪtə(ʊ)plaz(ə)m]	
plasma, *n*	[ˈplazmə]	
mitochondrion, *n*	[ˌmʌɪtə(ʊ)ˈkɒndrɪən]	
lysosome, *n*	[ˈlʌɪsəsəʊm]	
peroxisome, *n*	[peˈrɒksɪˌsoʊm]	
ribosome, *n*	[ˈrʌɪbə(ʊ)səʊm]	
vacuole, *n*	[ˈvækjuoʊl]	
prokaryote, *n*	[prəʊˈkarɪəʊt]	
eukaryote, *n*	[juːˈkarɪəʊt]	
protozoan, *n*	[ˌprəʊtə(ʊ)ˈzəʊən]	
fungus, *n*	[ˈfʌŋgəs]	
nucleus, *n*	[ˈnjuːklɪəs]	
endoplasmic reticulum	[ˌendoˈplæzmik rɪˈtɪkjʊləm]	
chromosome, *n*	[ˈkrəʊməsəʊm]	
mitotic spindle	[maɪˈtɒtɪk ˈspɪndl]	
synthesis, *n*	[ˈsɪnθɪsɪs]	

Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

1. The _____ plays an important role in a cell, serving as a “molecular soup”.
2. _____ is an organelle containing enzymes responsible for producing energy.

3. Humans have 23 pairs of _____.

4. _____ means "a network within the plasm".

5. A _____ is a particle made up of two or more atoms that are chemically bonded together.

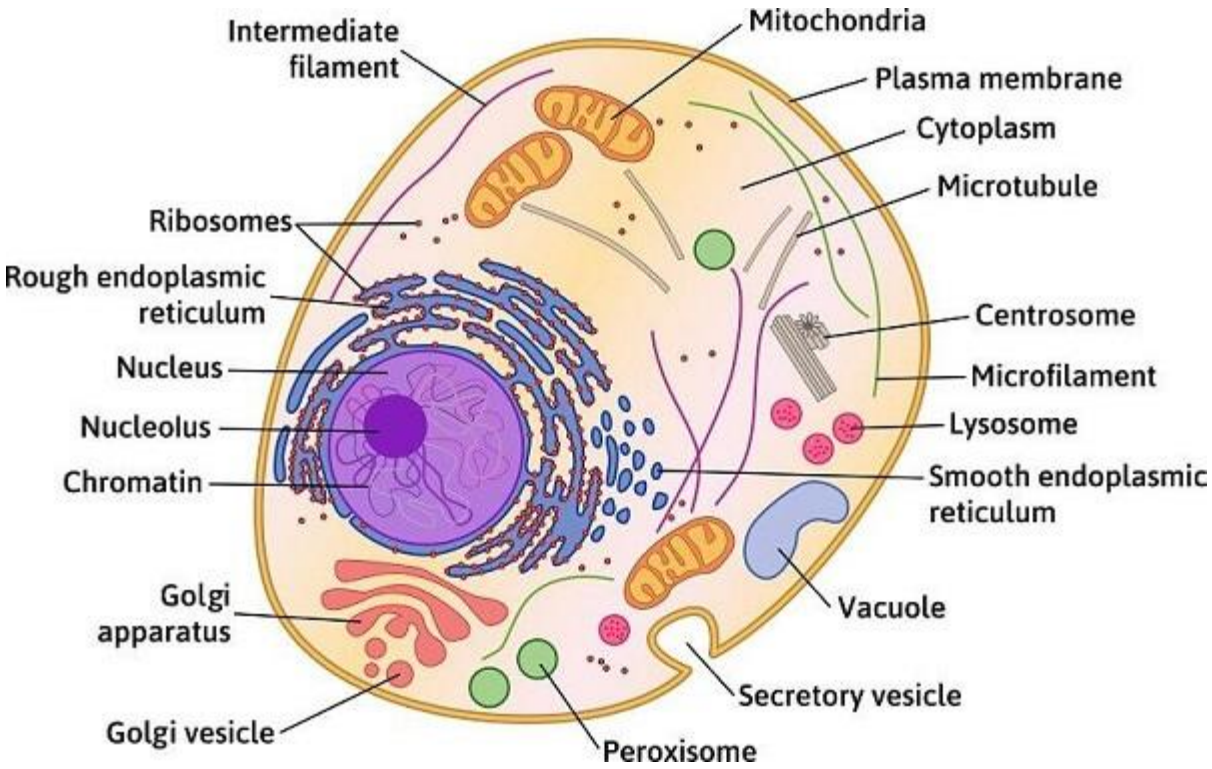
6. The spindle apparatus that forms during mitosis is referred to as _____.

7. _____ are defined as single-celled, heterotrophic, or colonial eukaryotes possessing non-filamentous structures.

8. A _____ is small and round, and it works as the cell's control center.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

1. The plasma membrane allows oxygen and nutrients to enter the cell while keeping toxins and waste products out. _____
2. Plants are prokaryotes, which means they lack a nucleus or other membrane bound organelles. _____
3. The chromosome doesn’t contain the DNA, the hereditary information in the cell. _____
4. Cells can have more than one nucleus or lack a nucleus all together._____
5. Mitochondria convert food nutrients such as glucose, to a fuel (ATP) that the cells of the body can use. _____
6. The Golgi apparatus transports lipids and creates lysosomes and organelles involved in excretion. _____
7. Lysosomes break down harmful cell products and waste materials, cellular debris, and foreign invaders such as bacteria. _____
8. Peroxisomes can convert hydrogen peroxide, a toxin made of H2O2 to H2O. _____



https://www.javatpoint.com/what-is-a-cell

Cells are the smallest structural and functional living units within our body, but play a big role in making our body function properly. Several different molecules interact to form organelles within our body. Each type of organelle has a specific function. The boundary of the cell, sometimes called the plasma membrane, separates internal metabolic events from the external environment and controls the movement of materials into and out of the cell.

The gel-like material within the cell membrane is referred to as the cytoplasm. It is a fluid matrix, which consists of 80% to 90% water, salts, organic molecules and many enzymes. Within the plasma membrane of a cell, the cytoplasm surrounds the nuclear envelope and the cytoplasmic organelles. The cell membrane keeps the cytoplasm from leaking out. It contains many different organelles such as the mitochondria, lysosomes, peroxysomes, ribosomes, several vacuoles and

cytoskeletons, as well as complex cell membrane structures such as the endoplasmic reticulum and the Golgi apparatus that each have specific functions within the cell.

Cells of all living things are divided into two broad categories: prokaryotes and eukaryotes. Bacteria are prokaryotes, which means they lack a nucleus or other membrane bound organelles. Eukaryotes include all protozoans, fungi, plants, and animals (including humans), and these cells are characterized by a nucleus (which houses the chromosomes) as well as a variety of other organelles.

Nucleus controls the cell; houses the genetic material (DNA). Inside each cell nucleus are chromosomes. Chromosomes are made up of chromatin, which is made up of protein and deoxyribonucleic acid strands. Centrioles are rod like structures, they are very important in cellular division, where they arrange the mitotic spindles that pull the chromosome apart. Ribosomes play an active role in the complex process of protein synthesis, each ribosome is composed of a large and small subunit which are made up of ribosomal proteins and ribosomal RNAs. Mitochondria are the organelles that function as the cell "powerhouse", generating ATP, the universal form of energy used by all cells. Endoplasmic reticulum plays an important role in making proteins and shuttling cellular products; also involved in metabolisms of fats, and the production of various materials.

The Golgi apparatus is the central delivery system for the cell. The Golgi apparatus transports lipids and creates lysosomes and organelles involved in digestion. Vacuoles are spaces in the cytoplasm that sometimes serve to carry materials to the cell membrane for discharge to the outside of the cell. Lysosomes are sac-like compartments that contain a number of powerful degradative enzymes, promoting cell death. They are built in the Golgi apparatus. Peroxisomes are organelles in which oxygen is used to oxidize substances, breaking down lipids and detoxifying certain chemicals.

Exercise 4. Focus on grammar: Past Simple – positive and negative.

Past Simple is used to describe events which happened in the past.

Regular English verbs form the simple past with -ed; however there are a few hundred irregular verbs with different forms.

Look at these sentences and complete the rules.

Analysis of cell morphology remained ever more important.

Biochemical complications led to characteristic cell changes (morphology) and death.

Cell biologists didn't use optical cell images for transparent specimens such as cells.

Microscopic examination didn't show any abnormalities.

- In *positive sentences Subject + ……. form* (or ….. *form of the verb*)
- In *negative sentences Subject + …… not + ……. form*

Exercise 5. Fill in the gaps with the correct Past form of the verb in brackets.

An alteration in cellular growth 1 _____ (indicate) a significant problem within the cell line. The form taken by a cell line 2 _____ (reflect) the tissue from which it was derived. The cells which 3 _____ (have) lipopolysaccharide 4 _____ (be) gram negative. The bacterial cells 5 _____ (vary) greatly in their size. The shape of cells 6 _____ (depend) mainly on functional adaptations. Under certain conditions some bacteria 7 _____ (become) very irregular in shape and sometimes abnormally enlarged. It was observed that the size of different cells 8 _____ (range) within broad limits. The great majority of cells 9 _____ (can be) visible only under microscope. Sometimes the use of stains that 10 _____ (act) on the living organism 11 _____ (facilitate) observation of the living cell. We 12 _____ (not examine) the biological basis of these cell differences. It was found that the cells of certain unicellular forms such as Amaeba, Diatoms, Acetabularia and bacteria 13 _____ (exhibit) a number of shapes. Investigators 14 _____ (show) earlier that cancer cells had lower crossover frequencies than peripheral blood cells. Scientists 15 _____ (study) the morphology of living cells by means of holograms and digital holographic microscopy. It was discovered that abnormal cells 16 _____ (develop) into cancer.

Exercise 6. Fill in the table. Check the meaning of new words in a dictionary.

verb	noun	adjective
derive	derivation	
cell	cell	
abnormalize		abnormal
differentiate	difference	
vary	variety	
act		active
investigate		investigative
examine	examination	
	exhibit, exhibition	exhibited, exhibiting, exhibitory
		studied

Exercise 7. Use the word given in capitals at the end of each line to form a word that fits in the gap in the same line.

1. All physiological processes, disease, growth and development can be described at the _____ level. CELL
2. The _____ of the biological basis of these cell differences is very important. EXAMINE
3. Cells lining the tubule have numerous mitochondria, enabling _____ transport to take place by the ATP energy. ACT
4. _____ of cell morphology and size is usually carried out by light microscopy. INVESTIGATE
5. A strong knowledge of the _____ cellular organelles and their functions is important to any physiologist. VARY
6. Megakaryocytes are cells _____ from stem cells in the bone marrow. DERIVE
7. Down syndrome result from having an _____ number of chromosomes. NORMAL

8. These cells have demonstrated the ability to _____ into a number of different cell-types, including brain, liver and bone. DIFFER

Exercise 8. Focus on grammar: Past Simple – questions. Look at these questions and complete the rule.

How did they investigate cell types in vitro or in vivo?

Did you hear that the great majority of cells can be visible only under microscope?

- We form Past Simple *questions* with:
- *question word* + _____ + *Subject* + ……. *form.*
    - _____+ *Subject* +……. *form***.**

Exercise 9. Make questions with these words. Use Past Simple.

1. In what way/the scientists/isolate/submicroscopic components/of this substance?
2. What analysis/they/use/to control/key proteins?
3. What theory/the investigators/propose/to explain/Hertwig's rule?
4. This method/fail//to give/conclusive information/of various cells structures?
5. What/the analysis/reveal?
6. How/they/study/the morphology of living cells?
7. Regular /examining of cell morphology/play/an important role/in cell culture experiments?
8. How many categories/the scientists/divide/most mammalian cells/in culture?

Exercise 10. Medical vocabulary: combining forms.

Study the meaning of combining forms:

Combining form	cyt/o-	path/o-	ecto-	intra-
Meaning	cell	disease	outside	in, within

Match medical terms 1-10 to their definitions a-j.

1 cyton, 2 ectoplasm, 3 cytoplasm, 4 intracellular, 5 intracapsular, 6 ectopia, 7 pathology, 8 cytologist, 9 ectoderm, 10 pathogenesis

a) the study of changes in the way the body works that result from disease - **7 pathology**
b) the wrong position of an organ or body part – _____
c) happening inside a cell or cells- _____
d) specialist in study of cells – _____
e) inside a capsule (= a flexible structure around an organ, joint, or other body structure) –_____
f) the central part of a neuron (= a cell that sends and receives messages within the brain and nerves)– _____
g) the outer layer of particular types of cell– _____
h) the cause and development of a disease, especially within cells – _____
i) the cells in the embryo of a human or animal that develop into skin, hair, and the nervous system – _____
j) the substance inside a cell that surrounds the cell's nucleus - _____

Supplementary Tasks

Exercise 1. Write the plural of the following nouns.

singular	plural
mitochondrion	
nucleus	
peroxisome	
plasma	
protozoan	
fungus	
bacterium	
debris	

Exercise 2. Read the text. Fill in the table after the text.

Cells within the human body contain thousands of genes, proteins and other chemicals enclosed within cellular membranes. Each cell responds to chemical signals from the body or the environment and modifies its behavior in response to signals. Cellular diseases occur when cells dysfunction; this may include the development of too many cells, deficiencies in existing cells or dysfunction or loss of essential cells. Cellular diseases vary in severity and the types of cells they affect, sometimes proving fatal.

Cancer is among the most common diseases in the world: Cancer is used to describe hundreds of diseases, all of which occur when normal cells develop genetic mutations that lead to abnormal cell proliferation, usually leading to the formation of tumors.

At the head of cancer development are genetic mutations, which lead to changes in cellular behavior that allow the cells to divide uncontrollably. Several treatments for cancers aim to inhibit essential cellular processes to stop cell division and lead to cancer cell death. If left untreated, cancer cells have the ability to migrate throughout the body to form tumors in distant tissues, which can lead to death.

Another common cell disease is sickle-cell disease, a blood disorder characterized by defects in erythrocytes, or red blood cells. Red blood cells contain a molecular complex called hemoglobin, an iron-containing molecule which binds to oxygen and carries it throughout the bloodstream. In sickle-cell disease, the hemoglobin in red blood cells is mutated, so the cells cannot effectively carry oxygen to tissues throughout the body. The mutation also changes the shape of the red blood cell from a rounded shape to sickle shape, further causing problems in the blood.

Patients with sickle-cell disease experience anemia from a lack of sufficient oxygenation of tissues, along with shortness of breath, cold hands and feet and pain. Sickle-cell disease may require blood transfusions to treat the disease.

Another cellular disease is Alzheimer's, which affects the nerve cells in the brain called neurons. Neurons form a complex network of communication with other nerve cells in the brain, and ultimately transmit signals to the body.

Patients with Alzheimer's disease develop harmful protein aggregates called protein plaques, which disrupt the function of neighboring neurons. The cellular structure of the neuron begins to collapse, creating structures called neurofibrillary tangles that ultimately cause neuron cell death. As a result of progressive neuron loss, patients with Alzheimer's suffer from dementia and memory loss, as well as defects in motor function and personality and behavioral changes. Although Alzheimer's is incurable, a number of drugs can slow the progression of the disease to increase patient quality of life.

Disease	Cause	Symptoms
Cancer		
Sickle-cell disease		
Alzheimer's disease		

Exercise 3. Match the meanings to the following words.

1. tissue	a. any heritable change of the base-pair sequence of genetic material
2. anemia	b. an abnormal growth
3. dysfunction	c. a cell of the nervous system
4. plaque	d. a progressive decline in cognitive function
5. sufficient	e. a group of similar cells that function together to do a specific job

6. tumor	f. a medical condition in which the capacity of the blood to transport oxygen to the tissues is reduced
7. neuron	g. the breakdown of the structure of a cell
8. dementia	h. a failure to function in an expected or complete manner
9. cell death	i. an accumulation in artery walls
10. mutation	j. adequate to what is needed

Exercise 4. Translate into Ukrainian.

A low level of albumins and fibrinogen was detected in the patient's blood. Decrease in the activity of which liver hepatocyte organelles is more likely to cause this phenomenon?

A. Reticular apparatus of Golgi

B. Agranular endoplasmic reticulum

C. Mitochondria

D. Granular endoplasmic reticulum

E. Lysosomes

_____

_____

_____

_____

_____

_____

_____

_____

Exercise 5. Translate into English.

В клітині штучно блокований синтез гістонових білків. Яка структура клітини буде пошкоджена?

А. Ядерний хроматин

В. Ядерце

C. Комплекс Гольджі

D. Клітинна оболонка

E. Ядерна оболонка

_____

_____

_____

_____

_____

_____

_____

_____

Exercise 6. Study the abbreviations and write their meaning in the table.

Abbreviation	Meaning
Bx, bx	
c	
C&S	
ETT	
HMD	
ID	
IU	
NK cell	
OD	
qPM	

UNIT 3

BLOOD PHYSIOLOGY

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the translation of the words in the table.

albumin, *n*	[ˈælbjʊmɪn]	
bi-concave, *adj*	[baɪ-ˈkɒnˈkeɪv]	
blood clot	[blʌd klɒt]	
diverse, *adj*	[daɪˈvɜːs]	
buffer system	[ˈbʌfə ˈsɪstɪm]	
engulf, *v*	[ɪnˈgʌlf]	
erythrocyte, *n*	[ɪˈrɪθrəʊˌsaɪt]	
fluid, *n*	[ˈflu(ː)ɪd]	
leucocyte, *n*	[ˈljuːkəʊsaɪt]	
maintain, *v*	[meɪnˈteɪn]	
metabolic exchange	[ˌmɛtəˈbɒlɪk ɪksˈʧeɪnʤ]	
nyeloid, *n*	[ˈmʌɪələɪd]	
nucleus, *n*	[ˈnuːkliəs]	
nutrient, *n*	[ˈnjuːtrɪənt]	
osmotic balance	[ɒzˈmɒtɪk ˈbæləns]	
oxygen, *n*	[ˈɔksɪdʒən]	
translucent, *adj*	[trænzˈluːsnt]	
urea, *n*	[ˈjʊərɪə]	

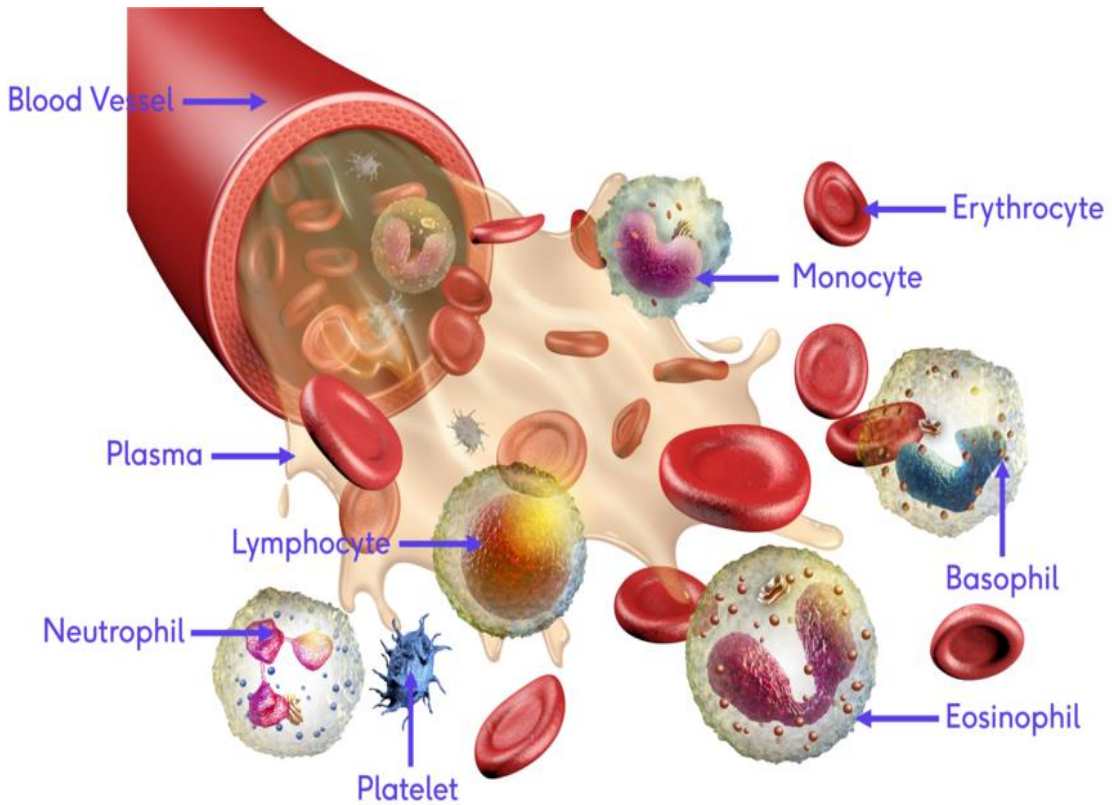
Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

1. _____ are the cells of the immune system that protect our tissues from different forms of damage.
2. _____ _____ can lead to serious medical problems such as a stroke or a heart attack.
3. _____ carry oxygen and carbon dioxide to and from the tissues of the body.
4. In order to live, grow and reproduce, we need _____, which can be found in food.

5. Platelets are tiny cells that have no _____.
6. The hemoglobin has red colour because of the iron, which binds to _____ .
7. _____ are formed with the help of the protein, which is called fibrin.
8. _____ _____ controls optimal concentrations of electrolytes and non-electrolytes that can be found in tissues and cells of the body.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

1. With the help of blood clots blood helps to maintain homeostasis in our body ___.
2. Leukocytes are made of hemoglobin which makes them transparent ___.
3. Erythrocytes are also known as bi-concave because of their shape of a disk ___.
4. Only two major groups of proteins are known today ___.
5. Blood consists of plasma, leucocytes, erythrocytes and platelets ___.
6. There are about 6 substances which take part in the clotting process ___.
7. Albumins play a key role in our body, providing the osmotic balance between the blood and tissue fluids ___.
8. Because of the pumping action of the heart, blood circulates in the body ___.



https://www.physio-pedia.com/Blood_Physiology

Blood is a circulating tissue composed of fluid plasma and cells (red blood cells, white blood cells, platelets). Anatomically, blood is considered a connective tissue, due to its origin in the bones and its function. Blood is the means and transport system of the body used in carrying elements (e.g. nutrition, waste, heat) from one location in the body to another, by way of blood vessels.

Blood is made of two parts:

1. Plasma which makes up 55% of blood volume.

2. Formed cellular elements (red and white blood cells, and platelets) which combine to make the remaining 45% of blood volume.

Plasma is made up of 90% water, 7-8% soluble proteins, 1% electrolytes, and 1% elements in transit. One percent of the plasma is salt, which helps with the pH of the blood. The largest group of solutes in plasma contains three important proteins: albumins, globulins, and clotting proteins. The main function of albumins is to maintain the osmotic balance between the blood and tissue fluids and is called colloid osmotic pressure. Globulins are a diverse group of proteins, designated into three groups: gamma, alpha, and beta. Their main function is to transport various substances in the blood. There are at least 12 substances, known as "clotting factors" that participate in the clotting process. One important clotting protein that is part of this group is fibrinogen, one of the main components in the formation of blood clots.

Plasma also carries respiratory gases; CO2 in large amounts (about 97%) and O2 in small amounts (about 3%), various nutrients (glucose, fats), wastes of metabolic exchange (urea, ammonia), hormones, and vitamins.

Red blood cell (erythrocyte) also known as "RBC's". RBC’s are formed in the myeloid tissue or most commonly known as red bone marrow. They are about 7-8 micrometers in diameter. RBCs live about 120 days and do not self repair. RBC's

contain hemoglobin which transports oxygen from the lungs to the rest of the body, such as to the muscles, where it releases the oxygen load. The hemoglobin gets it's red color from their respiratory pigments. RBCs have a shape of a disk that appears to be “caved in” or almost flattened in the middle; this is called bi-concave. The main component of the RBC is hemoglobin protein which is about 250 million per cell.

White blood cells are different from red cells in the fact that they are usually larger in size 10-14 micrometers in diameter. White blood cells do not contain hemoglobin which in turn makes them translucent. White blood cells (leukocytes) are also known as "WBC's". White blood cells are made in the bone marrow but they also divide in the blood and lymphatic systems. The WBCs' main function is being phagocytic which means to engulf or swallow cells.

Platelets, also called thrombocytes, are membrane-bound cell fragments. Platelets have no nuclei, they are between one to two micrometers in diameter. Less than 1% of whole blood consists of platelets. They result from fragmentation of large cells called megakaryocytes - which are cells derived from stem cells in the bone marrow. The sticky surface of the platelets allow them to accumulate at the site of broken blood vessels to form a clot. This aids in the process of hemostasis ("blood stopping").

Blood enables hormones and other substances to be transported between tissues and organs. Blood is also involved in maintaining homeostasis by acting as a medium for transferring heat to the skin and by acting as a buffer system for bodily pH. The blood is circulated through the lungs and body by the pumping action of the heart.

Exercise 4. Focus on grammar: Future Simple – positive and negative.

Future Simple is used to denote a future action, to show ability or to make a prediction.

Look at these sentences and complete the rules.

Tomorrow we shall do blood tests.

In our nearest future doctors will cure all the diseases of the blood.

We shan’t change the composition of our blood because it is impossible.

Red blood cells won’t die in 60 days.

- In positive sentences with *I, we we use* _____*+ infinitive.*
- In positive sentences with *he, she, it, you, they we use* _____ *+ infinitive.*
- In negative sentences with *I, we we use* _____ *+ infinitive.*
- In negative sentences with *he, she, it, you, they we use* _____ *+ infinitive.*

Exercise 5. Fill in the gaps with the correct form of the verb in brackets using Future Simple.

1. Blood tests _____ (help) us to reveal his drug abuse.
2. It _____ (lead) to the decrease of erythrocytes in your blood.
3. In most cases, patients _____ (ask) nurses to bring them analgesic.
4. A child _____ (inherit) blood type from his mother or father.
5. If the Rh Factor enters the child destroying the child's red blood cells, it _____ (cause) Hemolytic Disease.
6. Next month blood bank technicians _____ (check) blood for agglutination with the help of microscope.
7. Doctors hope that in our nearest future blood transfusion _____ (not to be) a potentially risky medical procedure.
8. Her physician thinks that she _____ (carry) fetus with a different blood type.

Exercise 6. Fill in the table. Check the meaning of new words in a dictionary.

verb	noun	adjective
		decreased, decreasing
		abused
transfuse		
	injury	
	risk-taker, risk	
		bloody
	cause	

lose		
administer		
	complaint	
		testing, testable

Exercise 7. Use the word given in capitals at the end of each line to form a word that fits in the gap in the same line.

1. Blood _____ should be done immediately.	TRANSFUSE
2. The patient has already recovered from leukemia and now he doesn't have any _____.	COMPLAIN
3. A lot of injured people died because of the blood _____.	LOSE
4. Blood transfusion is a _____ medical procedure.	RISK
5. Doctors always do everything possible to prevent the process of _____ of erythrocytes in the body.	DECREASE
6. In spite of his drug _____, he decided to overcome his addiction.	ABUSED
7. What makes a wound stop _____.	BLOOD
8. Doctors can detect pregnancy in a blood _____ at early stage.	TESTING

Exercise 8. Focus on grammar: Future Simple – questions.

Look at these questions and complete the rule.

What will you need for your blood test next week?

What shall we know about blood in 50 years?

- We make Future Simple questions with:
  question word + _____ *or* _____ + *subject* + _____.

Exercise 9. Put questions to the words in bold. Use Future Simple.

1. **Blood tests** will help us to reveal cancer.
2. Medical students will tell their tutor about **four** blood types tomorrow.
3. **She** will carry fetus with a different blood type.

4. It will be important for medical students to know **the table for plasma transfusions**.
5. Some of these tests will help us to show the exact amount of hGG in our **blood**.
6. It will cause the **decrease of erythrocytes** in your blood.
7. Tomorrow **Rh negative mothers who are pregnant with an Rh positive infant**, will take Rh immune globulin.
8. **In our distant future** it will be possible to detect leukemia at early stage.

Exercise 10. Medical vocabulary: combining form.

Study the meaning of combining form:

Combining form	phago-	os-	leuco-	erythro-
Meaning	eating, devouring	bone	white	red

Match medical terms 1-10 to their definitions a-j.

1 leucocytes, 2 erythrocytes, 3 erythrocyanosis, 4 phagocyte, 5 osmosis, 6 leukemia, 7 leucotomy , 8 osmotic balance, 9 phagocytosis, 10 erythrocuprin

a) white blood cells **– 1 leucocytes**
b) a copper-carrying plasma protein – _____
c) a key function of the body **–** _____
d) prefrontal lobotomy – _____
e) red blood cells **–** _____
f) the process of destroying bacteria – _____
g) movement of water towards the membrane – _____
h) a cell that destroys bacteria and absorbs waste material – _____
i) red discoloration on the lower limbs – _____
j) cancer of the bone marrow **–** _____

Supplementary Tasks

Exercise 1. Find information about the diet and diseases which depend on blood type and complete the table.

Blood type	The blood type diet	Names of the diseases
Group A		
Group B		
Group AB		
Group O		

Exercise 2. You are going to read an abstract of an article about *Blood typing and crossmatching* . Six sentences have been removed from the article. Choose from the sentences A-G the one which fits each gap (1-6). There is one extra sentence which you do not need to use.

Blood typing and crossmatching

Blood typing and crossmatching are most commonly done to make certain that a person who needs a transfusion will receive blood that matches (is compatible with) his own. People must receive blood of the same blood type, otherwise, a serious, even fatal, transfusion reaction can occur. [1]_____. If the person needs a blood transfusion, another test called crossmatching is done after the blood is typed to find blood from a donor that the person's body will accept.

Parents who are expecting a baby have their blood typed to diagnose and prevent hemolytic disease of the newborn (HDN), a type of anemia also known as erythroblastosis fetalis. [2]_____ . The disease is serious with certain blood type differences, but is milder with others. A child inherits factors or genes from each parent that determine his blood type. [3] _____.

Blood typing and crossmatching tests are performed in a blood bank laboratory by technologists trained in blood bank and transfusion services. The tests are done on blood, after it has separated into cells and serum (serum is the yellow liquid left after the blood clots.) Costs for both tests are covered by insurance when the tests are determined to be medically necessary.

Blood typing and crossmatching tests are based on the reaction between antigens and antibodies. [4] _____ The attack begins when the body builds a special protein, called an antibody, that is uniquely designed to attack and make ineffective (neutralize) the specific antigen that caused the attack. A person's body normally doesn't make antibodies against its own antigens, only against antigens that are foreign to it.

[5] _____ The antigens found on the surface of red blood cells are important because they determine a person's blood type.

When blood is typed, a person's cells and serum are mixed in a test tube with commercially-prepared serum and cells. Clumping tells which antigens or antibodies

are present and reveals the person's blood type. [6] _____ Clumping or lack of clumping in the test tube tells whether or not the blood is compatible. Although there are over 600 known red blood cell antigens, organized into 22 blood group systems, routine blood typing and crossmatching is usually concerned with only two systems: the ABO and Rh bloodgroup systems.

A. An antigen can be anything that causes the body to launch an attack, known as an immune response, against it.
B. This fact makes blood typing useful in paternity testing.
C. ABO typing is the first test done on blood when it
is tested for transfusion.
D. When blood is crossmatched, patient serum is mixed with cells from donated blood that might be used for transfusion.
E. Blood typing is a laboratory test done to determine a person's blood type.
F. A person's body contains many antigens.
G. Babies who have a blood type different from their mothers are at risk for developing this disease.

Exercise 3. Translate into Ukrainian.

A patient is 20 years old, an athlete. He addressed a doctor with complaints of fatigue, fever up to 38oC - 40oC. Objectively: the liver and spleen are enlarged, lymph nodes on palpation are slightly enlarged, dense, painless. Blood test: Hb- 100 g/l; erythrocytes - 2, 9 · 1012/l; leukocytes - 4, 4 · 109/l. Leukogram: 68% of blast cells. Cytochemical investigation of blast cells revealed negative reactions to glycogen, peroxidase, non-specific esterase, lipids. Name this disease:

A. Acute lymphoblastic leukemia
B. Acute myeloid leukemia
C. Acute monoblastic leukemia
D. Acute undifferentiated leukemia
E. Acute megakaryoblastic leukemia

_____

_____

_____

_____

_____

_____

_____

_____

Exercise 4. Translate into English.

У людини з масою 80 кг після тривалого фізичного навантаження об'єм циркулюючої крові зменшився, гематокрит - 50%, загальний білок крові - 80 г/л. Такі показники крові є наслідком, перш за все:

A. Збільшення кількості еритроцитів

B. Втрати води з потом

C. Збільшення вмісту білків у плазмі

D. Збільшення онкотичного тиску плазми

E. Збільшення діурезу

_____

_____

_____

_____

_____

_____

_____

_____

Exercise 5. Study the abbreviations and write their meaning in the table.

Abbreviation	Meaning
A, B, AB, O	
ALL	
AML	
CBC	
diff	
ESR	
eos	
MCHC	
RBC	
WBC	

UNIT 4

PATHOPHYSIOLOGY OF THE BLOOD SYSTEM

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the translation of the words in the table.

inherited, *adj*	[ɪnˈherɪtɪd]	
equally, *adv*	[ˈɪːkwəlɪ]	
clot, *v*	[klɒt]	
acquired, *adj*	[əˈkwaɪərd]	
manage, *v*	[ˈmænɪdʒ]	
range, *n*	[reɪndʒ]	
breakdown, *n*	[ˈbreɪkdaʊn]	
severity, *n*	[sɪˈverətɪ]	
intervention, *n*	[ˌɪntəˈvenʃən]	
consumptive, *adj*	[kənˈsʌmptɪv]	
deplete, *v*	[dɪˈplɪːt]	
bump, *n*	[bʌmp]	
jar, *n*	[dʒɑːr]	
bruising, *n*	[ˈbruːˑzɪŋ]	
amongst, *prep*	[əˈmʌŋst]	
survival, *n*	[səˈvʌɪv(ə)l]	
ensure, *v*	[ɪnˈʃɔː]	
excessive, *adj*	[ɪkˈsɛsɪv]	
lack, *n*	[læk]	
malignant, *adj*	[məˈlɪgnənt]	

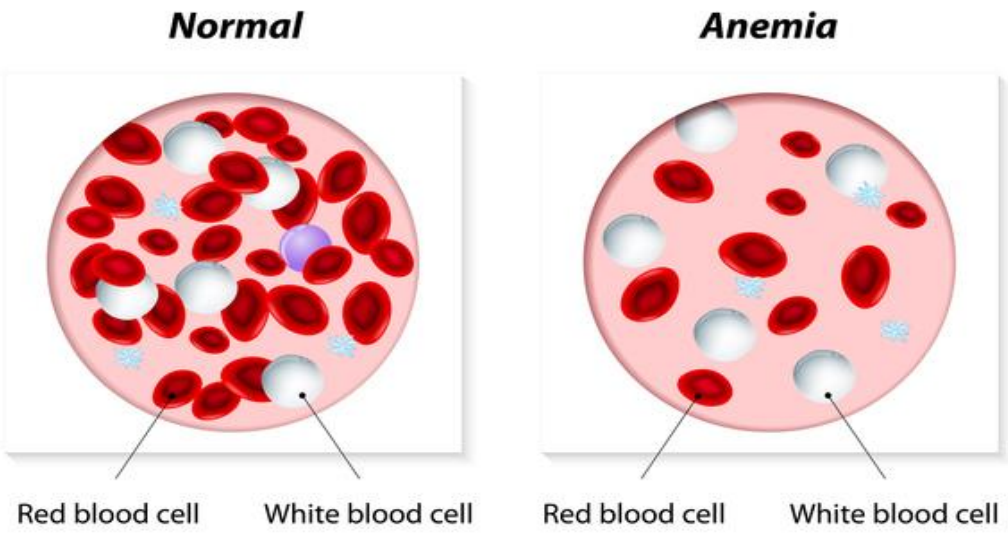
Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

1. A _____is the gravity of morbidity observed in a patient.
2. _____ is a hypodermic accumulation of blood, which occurs after an injury.

3. _____ is exceeding the standard norm of something.
4. _____ is something which is received by someone from someone else.
5. _____ refers to a characteristic that develops only after birth.
6. An _____ is an action that is intended to improve a medical condition.
7. The term _____ refers to something that is not enough.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

1. Von Willebrand disease affects both men and women equally. ___
2. Von Willebrand disease is similar to consumptive coagulopathy in that it involves a definciency in the ability of blood to clot properly. ___
3. Von Willebrand disease is an acquired syndrome in most cases. ___
4. Disseminated intravascular coagulation occurs in critically ill patients, especially those with Gram-positive sepsis. ___
5. Hemophilia is passed down from mothers to their sons. ___
6. People with hemophilia have an increased ability to make blood clots. ___
7. Anemia refers to a deficiency of red blood cells and/or hemoglobin. ___
8. There are four main classes of anemia. ___
9. People with leukemia may become bruised, bleed excessively, or develop pin-prick bleeds. ___



https://thalsocietysg.org/2017/06/09/thalassaemia-minor/

The primary function of blood is to supply oxygen and nutrients as well as constitutional elements to tissues and to remove waste products. Hormones and other substances are also transported between tissues and organs with blood. Problems with blood composition or circulation can lead to downstream tissue malfunction.

Von Willebrand disease is the most common inherited bleeding disorder. It is similar to hemophilia in that it involves a definciency in the ability of blood to clot properly. While it is mostly an inherited disease (with factors contributed by both parents), von Willebrand disease may be an acquired syndrome in rare cases. Both men and women are equally affected by this disorder.

In many cases treatment to manage the disease is not required. However, if treatment is necessary, it may include a range of different interventions depending on the severity. These involve medicine to increase the level of von Willebrand factor in the blood (DDAVP), medicine to prevent the breakdown of clots (called antifibrinolytic drugs), medicine to control heavy menstrual bleeding in women (often birth control pills), or injection of clotting factor concentrates (containing von Willebrand factor and factor VIII).

Disseminated intravascular coagulation, which is also called consumptive coagulopathy, is a pathological process in the body where the blood starts to coagulate throughout the whole body. Hence, the body is depleted of its platelets and coagulation factors, and there is a paradoxically increased risk of hemorrhage. It occurs in critically ill patients, especially those with Gram-negative sepsis (particularly meningococcal sepsis) and acute promyelocytic leukemia.

Hemophilia is a disease where there is low or no blood protein, causing an inability to produce blood clots. There are two types of Hemophilia: Type A, which is a deficiency in factor VIII and Type B, (Christmas disease) a deficiency on factor IX. Because people with hemophilia do not have the ability to make blood clots, even a little cut may kill them, or the smallest bump or jar to the body could cause severe bruising that doesn't get better for months. This disease is passed down from mothers to their sons.

Anemia (AmE) or *anaemia* (BrE), from the Greek (Ἀναιμία) meaning "without blood", refers to a deficiency of red blood cells (RBCs) and/or hemoglobin. This results in a reduced ability of blood to transfer oxygen to the tissues, causing hypoxia. Since all human cells depend on oxygen for survival, varying degrees of anemia can have a wide range of clinical consequences. Hemoglobin (the oxygen-carrying protein in the red blood cells) has to be present to ensure adequate oxygenation of all body tissues and organs.

The three main classes of anemia include excessive blood loss, excessive blood cell destruction or deficient red blood cell production.

Leukemia is a cancer of the blood or bone marrow characterized by an abnormal proliferation of blood cells, usually white blood cells (leukocytes). It is part of the broad group of diseases called hematological neoplasms. Damage to the bone marrow, by way of displacing the normal marrow cells with increasing numbers of malignant cells, results in a lack of blood platelets, which are important in the blood clotting process. This means people with leukemia may become bruised, bleed excessively, or develop pin-prick bleeds (petechiae). All symptoms may also be attributable to other diseases; for diagnosis, blood tests and a bone marrow biopsy are required.

Exercise 4. Focus on grammar: Present Simple Passive – positive and negative.

Present Simple Passive is used to say that something happens all the time or repeatedly, or that something is true in general. This structure is used when the person or object of an action is obvious or insignificant, or when the action or its result is more important than the person or object.

Look at these sentences and complete the rules with *Past Participle, not, are, is.*

This disease is passed down from mothers to their sons.

For diagnosis, blood tests and a bone marrow biopsy are required.

In many cases treatment to manage the disease is not required.

- To make *positive sentences* in Present Simple Passive *we use subject +am,* ___ or ___ + *Past Participle*
- To make *negative sentences* in Present Simple Passive we use *subject +am,* ___ or ___ + ___ + *Past Participle*

Exercise 5. Fill in the gaps with the Present Simple active or passive of the verbs in brackets.

The porphyrias are disorders in which the body 1 _____ (produce) too much porphyrin and insufficient heme. Excess porphyrins 2 _____ (excrete) as waste in the urine and stool. Unhealthy levels of heme and certain important enzymes 3_____ (cause) by overproduction and overexcretion of porphyrins. This 4 _____ (create) various physical symptoms.

Biosynthesis of heme is a multistep process that 5 _____ (begin) with simple molecules and 6 _____ (end) with a large, complex heme molecule. Each step of the chemical pathway 7 _____ (direct) by its own task-specific protein, called an enzyme. As a heme precursor molecule 8 _____ (move) through each step, an enzyme 9 _____ (modify) the precursor in some way. If a precursor molecule 10 _____ (not modify), it cannot 11 _____ (proceed) to the next step, causing a buildup of that specific precursor. Owing to a defect in one of the enzymes of the heme biosynthesis pathway, protoporphyrins or porphyrins 12 _____ (prevent) from proceeding further

along the pathway. These precursors 13 _____ (accumulate) at the stage of the enzyme defect causing an array of physical symptoms. Specific symptoms 14 _____ (depend) on the point at which heme biosynthesis 15 _____ (block).

Exercise 6. Fill in the table. Check the meaning of new words in a dictionary.

verb	noun	adjective
		productive, unproductive, reproductive
	health	
		various
	simplicity	
remove		
		preventable, preventive
accumulate		
		causative
depend		
	block, blockage	

Exercise 7. Use the word given in capitals at the end of each line to form a word that fits in the gap in the same line.

1. The _____ of heme is concentrated in the liver and bone marrow. PRODUCE
2. As the disease progresses, the spleen may be _____ in an attempt to try to improve the blood counts. REMOVE
3. Most cancers are _____ by changes in lifestyle or diet, which will reduce the risk factors. PREVENTIVE
4. The net effect of this continued production is an abnormal _____ of precursor molecules and development of some type of porphyria. ACCUMULATE

5. 20–50% of patients with thrombocytosis had some _____ of veins or arteries.	BLOCK
6. The type of treatment chosen _____ on the type of Von Willebrand disease.	DEPENDENCY
7. Anemia develops when heavy bleeding _____ significant iron loss.	CAUSATIVE
8. The immature cells begin to accumulate in _____ organs and tissues.	VARIETY

Exercise 8. Focus on grammar: Present Simple Passive – questions.

Look at these questions and complete the rule.

What is transported between tissues and organs with blood?

What tests are required for the diagnosis of leukemia?

- We make Present Simple Passive questions with:
  question word + am, ___ or ___ + subject + Past Participle.

Exercise 9. Make questions with these words. Use Present Simple Passive.

Ask and answer the questions in pairs.

9. What / also / transport / between tissues and organs with blood?
10. Men or women / more / affect / by von Willebrand disease?
11. Treatment to manage von Willebrand disease / always / require?
12. How / disseminated intravascular coagulation / also / call?
13. What / the body / deplete of / with disseminated intravascular coagulation?
14. How / Hemophilia / pass down?
15. What / leukemia / characterize / by?
16. How / excess porphyrins / secrete / from the body?

Exercise 10. Medical vocabulary: combining forms.

Study the meaning of combining forms:

Combining form	h(a)em/o- h(a)emat/o-	blast/o-	myel/o-	thromb/o-
Meaning	blood	embryonic cell	bone marrow; spinal cord	blood clot

Match medical terms 1-10 to their definitions a-j.

1 hematophobia, 2 blastopathy, 3 thrombophlebitis, 4 haemolytic, 5 myeloblast, 6 myelomalacia, 7 haematothermal, 8 thrombocytopenia, 9 blastocyst, 10 myelofibrosis

a) persistent and irrational fear of bleeding or the sight of blood - **1 hematophobia**

b) an early embryonic stage of five to six days - _____

c) having a permanent, relatively high and sustainable body temperature - _____

d) an abnormal drop in the number of blood cells involved in forming blood clots - _____

e) a rare disease of the bone marrow in which fibrous scar tissue is built up - _____

f) referring to or involving the destruction of erythrocytes with subsequent liberation of hemoglobin - _____

g) a condition referring to softening of the spinal cord - _____

h) the inflammation of a vein with blood clot formation - _____

i) anomaly of blastula that develops in the first fifteen days after fertilization - _____

j) a cell of bone marrow from which white blood cells of the granulocytic series develop - _____

Supplementary Tasks

Exercise 1. Find information about the diseases listed below and complete the table.

Name of the disease and its main characteristics	Causes of the disease	Symptoms of the disease	Treatment of the disease
Amyloidosis			
Immune Thrombocytopenia			
Venous Thrombosis			
Giant cell arteritis			
Wiskott Aldrich syndrome			

Exercise 2. You are going to read an abstract of an article about a disease called *Thalassemia.* Six sentences have been removed from the article. Choose from the sentences A-G the one which fits each gap (1-6). There is one extra sentence which you do not need to use.

Thalassemia

Thalassemia describes a group of inherited disorders characterized by reduced or absent amounts of hemoglobin, the oxygen-carrying protein inside the red blood cells. There are two basic groups of thalassemia disorders: alpha thalassemia and beta thalassemia. [1]_____

All types of thalassemia are considered quantitative diseases of hemoglobin, because the quantity of hemoglobin produced is reduced or absent. Usual adult hemoglobin is made up of three components: alpha globin, beta globin, and heme. [2]_____ Although both classes of thalassemia affect the same protein, the alpha and beta thalassemias are distinct diseases that affect the body in different ways.

Humans normally make several types of the oxygen-carrying protein hemoglobin. An individual's stage in development determines whether he or she makes primarily embryonic, fetal, or adult hemoglobins. All types of hemoglobin are made of three components: heme, alpha (or alpha-like) globin, and beta (or beta-like) globin. All types of thalassemia are caused by changes in either the alpha- or beta-globin gene. These changes cause little or no globin to be produced. [3] _____All types of thalassemia are recessively inherited, meaning that a genetic change must be inherited from both the mother and the father. The severity of the disease is influenced by the exact thalassemia mutations inherited, as well as other genetic and environmental factors. There are rare exceptions, notably with beta thalassemia, where globin gene mutations exhibit a dominant pattern of inheritance in which only one gene needs to be altered in order to see disease expression.

Thalassemia may be suspected if an individual shows signs that are suggestive of the disease. In all cases, however, laboratory diagnosis is essential to confirm the exact diagnosis and to allow for the provision of accurate genetic counseling about recurrence risks and testing options for parents and affected individuals. A complete

blood count will identify low levels of hemoglobin, small red blood cells, and other red blood cell abnormalities that are characteristic of a thalassemia diagnosis. [4] _____ A hemoglobin electrophoresis is a test that can help identify the types and quantities of hemoglobin made by an individual. It can also detect structurally abnormal hemoglobins that may be co-inherited with a thalassemia trait to cause thalassemia disease or other types of hemoglobin disease. [5] _____ This can be performed to help confirm the diagnosis and establish the exact genetic type of thalassemia.

Diagnosis of thalassemia can occur under various circumstances and at various ages. [6] _____ This allows for early identification and treatment. Pregnant woman and couples may choose prenatal testing in order to prepare for the birth of a baby that may have thalassemia. Alternately, knowing the diagnosis during pregnancy allows for the option of pregnancy termination.

A. For instance, a new mutation for alpha-thalassemia was discovered for the first time among Iranian patients in 2004.
B. Since thalassemia trait can sometimes be difficult to distinguish from iron deficiency, tests to evaluate iron levels are important.
C. Thalassemias are classified according to the globin that is affected, hence the names alpha and beta thalassemia.
D. These conditions cause varying degrees of anemia, which can range from insignificant to life threatening.
E. Sometimes DNA testing is needed in addition to the above screening tests.
F. Several states offer thalassemia screening as part of the usual battery of blood tests done for newborns.
G. The thalassemias are, therefore, considered quantitative hemoglobin diseases.

Exercise 3. Translate into Ukrainian.

A patient, who suffers from congenital erythropoietic porphyria, has skin photosensitivity. The accumulation of what compound in the skin can cause it?

A Protoporphyrin

B Heme

C Uroporphyrinogen 1

D Uroporphyrinogen 2

E Coproporphyrinogen 3

Exercise 4. Translate into English.

У хворого розширення вен і тромбофлебіт на медіальній поверхні гомілки. Яка вена уражена?

A. Малогомілкова вена

B. Задня великогомілкова вена

C. Мала підшкірна вена

D. Велика підшкірна вена

E. Передня великогомілкова вена

Exercise 5. Study the abbreviations and write their meaning in the table.

Abbreviation	Meaning
AIP	
CLL	
CML	
DIC	
EBV	
HDN	
ITP	
PT	
PTT	
SLE	

UNIT 5

ANATOMY AND PHYSIOLOGY OF CARDIOVASCULAR SYSTEM

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the translation of the words in the table.

base of heart	[beɪs əv hɑːt]	
apex, *n*	[ˈeɪpeks]	
aorta, *n*	[eɪˈɔːtə]	
atrium, *n*	[ˈeɪtriəm]	
cardiac output	[ˈkɑːdiæk ˈautput]	
heart beat	[hɑːt biːt]	
heart rate	[hɑːt reɪt]	
septum, *n*	[ˈseptəm]	
superior vena cava	[suːˈpɪəriə(r) ˈviːnə kava]	
inferior vena cava	[ɪnˈfɪəriər ˈviːnə kava]	
pump, *v*	[pʌmp]	
ventricle, *n*	[ˈventrɪkl]	
pulmonary valve	[ˈpʌlmənəri vælv]	
tricuspid valve	[trʌɪˈkʌspɪd vælv]	
pulmonary artery	[ˈpʌlmənəri ˈɑːtəri]	
mitral valve	[mʌitrəl vælv]	
aortic valve	[eɪˈɔːtɪk vælv]	
coronary artery	[ˈkɒrənəri ˈɑːtəri]	
posterior descending artery	[pɒsˈtɪəriər dɪˈsendɪŋ ˈɑːtəri]	
right marginal artery	[raɪt ˈmɑːdʒɪnəl ˈɑːtəri]	
chordae tendineae	[ˈkɔːdə tendɪneae]	
papillary muscle	[pəˈpɪləri ˈmʌsl]	
fossa ovalis	[ˈfɒsə ovalɪs]	
trabecular carnea	[trʌˈbəkular ˈkɑːneae]	

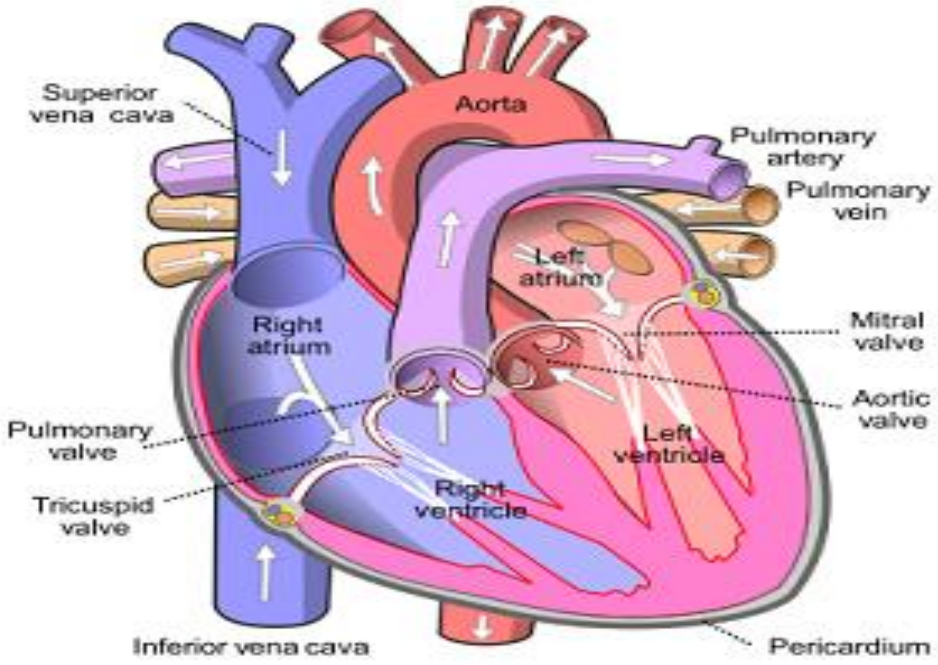
Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

1. _____ is a term used in cardiac physiology that describes the volume of blood being pumped by the heart, in particular by the left or right ventricle, per unit time.
2. _____ is the speed of the heartbeat measured by the number of contractions of the heart per minute (bpm).
3. _____ is typically a branch of the right coronary artery (70%, known as right dominance).
4. The _____, colloquially known as the heart strings, are tendon-resembling fibrous cord connective tissue that connect the papillary muscles to the tricuspid valve and the bicuspid valve in the heart.
5. The _____ is a depression in the right atrium of the heart, at the level of the interatrial septum, the wall between right and left atrium.
6. The purpose of the _____ is most likely to prevent suction that would occur with a flat surfaced membrane and thus impair the heart's ability to pump efficiently.
7. _____ is superior and medially located portion of the heart opposite the apex, which forms the upper border of the heart, lies just below the second rib, and primarily involves the left atrium, part of the right atrium, and the proximal portions of the great vessels.
8. _____ and _____ are considered as the two largest veins that carry deoxygenated blood from lower and upper halves of the body into the heart.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

1. The heart is responsible for pumping blood through the blood vessels by rhythmic contractions. ___
2. Cardiac muscle can contract, but it can’t conduct electricity, like nerves. ___
3. The heart consists of 5 chambers. ___
4. The heart is located inside a protective sac called the epicardium. ___
5. There are two layers to the pericardium: the fibrous pericardium and the serous pericardium. ___
6. The tricuspid valve is located between the right atrium and the right ventricle. ___

7. When the heart begins to contract, the heart enters a phase called diastole, and the atrium pushes blood into the ventricle. ___
8. The pulmonary semilunar valve lies between the right ventricle and the pulmonary trunk. ___



https://rnspeak.com/anatomy-and-physiology-of-the-heart/#Cardiovascular_System_Anatomy_and_Physiology

The heart is a hollow, muscular organ. It is responsible for pumping blood through the blood vessels by repeated, rhythmic contractions. The heart is composed of cardiac muscle, an involuntary muscle tissue that is found only within this organ. It has a four-chambered, double pump and is located in the thoracic cavity between the lungs. The cardiac muscle is self-exciting, meaning it has its own conduction system.

The endocardium is the inner lining of the heart which consists of the endothelial cells forming a smooth membrane, and a pocked and tribeculated surface (mainly the ventricles, or lower pumping chambers). The myocardium is the muscular tissue of the

heart. The myocardium is composed of specialized cardiac muscle cells with an ability not possessed by muscle tissue elsewhere in the body. Cardiac muscle, like other muscles, can contract, but it can also conduct electricity, like nerves. The blood to the myocardium is supplied by the coronary arteries. The outer layer next to the myocardium is known as the epicardium. This is the outer layer after endocardium and myocardium that consists of a thin layer of connective tissue and fat. The pericardium is the thick, membranous sac that surrounds the heart. It protects and lubricates the heart. There are two layers to the pericardium: the fibrous pericardium and the serous pericardium. The serous pericardium is divided into two layers; in between these two layers there is a space called the pericardial cavity.

The heart has four chambers, two atria and two ventricles. There are two atria on either side of the heart. On the right side is the atrium that contains blood which is poor in oxygen. The left atrium contains blood which has been oxygenated and is ready to be sent to the body. The right atrium receives de-oxygenated blood from the superior vena cava and inferior vena cava. The left atrium receives oxygenated blood from the left and right pulmonary veins. The ventricle is a heart chamber which collects blood from an atrium and pumps it out of the heart. There are two ventricles: the right ventricle pumps blood into the pulmonary circulation for the lungs, and the left ventricle pumps blood into the systemic circulation for the rest of the body.

The interventricular septum (ventricular septum, or during development septum inferius) is the thick wall separating the lower chambers (the ventricles) of the heart from one another.

The two atrioventricular (AV) valves are one-way valves that ensure that blood flows from the atria to the ventricles, and not the other way. The two semilunar (SL) valves are present in the arteries leaving the heart; they prevent blood from flowing back into the ventricles. The sound heard in a heartbeat is the heart valves shutting. The right AV valve is also called the tricuspid valve because it has three flaps. It is located between the right atrium and the right ventricle. The tricuspid valve allows blood to flow from the right atrium into the right ventricle when the heart is relaxed during diastole. When the heart begins to contract, the heart enters a phase called

systole, and the atrium pushes blood into the ventricle. Then, the ventricle begins to contract and blood pressure inside the heart rises. When the ventricular pressure exceeds the pressure in the atrium, the tricuspid valve snaps shut. The left AV valve is also called the bicuspid valve because it has two flaps. It is also known as the mitral valve due to the resemblance to a bishop's mitre (liturgical headdress). This valve prevents blood in the left ventricle from flowing into the left atrium. As it is on the left side of the heart, it must withstand a great deal of strain and pressure; this is why it is made of only two cusps, as a simpler mechanism entails a reduced risk of malfunction. There are two remaining valves called the semilunar valves. They have flaps that resemble half-moons. The pulmonary semilunar valve lies between the right ventricle and the pulmonary trunk. The aortic semilunar valve is located between the ventricle and the aorta.

Exercise 4. Focus on grammar: Past Simple Passive – positive and negative.

Past Simple Passive is used to express a single or permanent action which took place in the past, a succession of past actions, a recurrent action in the past. Past Simple Passive is formed by means of the auxiliary verb to be in the Past Simple and Past Participle (Participle II) of the main verb.

Look at these sentences and complete the rules.

Blood was then pumped through the tricuspid valve into the right ventricle.

456 patients with hypertension were examined by clinical methods of echocardiography and ambulatory blood pressure monitoring.

High blood pressure level was not revealed in that patient.

The results of treatment with angiotensin receptor antagonists were not mentioned.

The pressure was measured.

The results were written down in case history.

- In positive sentences with *I, he, she, it* or *singular nouns* we use _____+ Participle II.

- In positive sentences with *we, you, they* or *plural nouns* we use _____ + Participle II.
- In negative sentences with *I, he, she, it* or *singular nouns* we use _____ + Participle II.
- In negative sentences with *we, you, they* or *plural nouns* we use _____ + Participle II.
- Past Participle of regular verbs coincides in form with the _____ of these verbs.
- Past Participle of irregular verbs is formed _____.

Exercise 5. Fill in the gaps with the correct form of the verb in brackets.

The patient had been in her usual state of health until 18 months before the current admission, when the blood pressure 1 _____ (to note) to be 140/90 mm Hg during a routine appointment with her primary care physician. Therapy with oral contraceptive pills 2 _____(to discontinue), but the blood pressure 3 _____ persistently _____ (to elevate) when it 4 _____ (to measure) at home and during subsequent clinical evaluations. Results of duplex ultrasonography of the bilateral renal arterial vasculature were normal, as were levels of thyrotropin, plasma free catecholamines, plasma metanephrines, and aldosterone. Transthoracic echocardiography revealed normal ventricular function, with no evidence of valvular disease or left ventricular hypertrophy; the interventricular septal wall thickness was 11 mm (normal range, 7 to 11). Lisinopril 5 _____ (to administer), and the blood pressure decreased to 120/80 mm Hg. The patient 6 _____ (to discharge) from the hospital.

Exercise 6. Fill in the table. Check the meaning of new words in a dictionary.

verb	noun	adjective
admit		admitted
appoint		appointed
discontinue	discontinuation	
	elevation	elevated

	measurement, measurability	measured, measuring, measurable
	revealing	revealed
range		ranging, ranged
	administration	administrated
	decreasing	decreased
	discharge, discharging	discharged

Exercise 7. Use the word given in capitals at the end of each line to form a word that fits in the gap in the same line.

1. Four weeks before the current _____, swelling of the legs, abdominal distention, intermittent dyspnea on exertion, and fatigue developed, and the patient was evaluated in the emergency department of this hospital. ADMIT

2. Because the blood pressure was persistently _____, the dose of lisinopril was increased and treatment with metoprolol and nifedipine was initiated. ELEVATION

3. Furosemide was _____ intravenously, and the patient reported a decrease in the dyspnea and swelling. ADMINISTER

4. Computed tomographic (CT) angiography of the chest, performed after the administration of intravenous contrast material, _____ segmental and subsegmental pulmonary emboli in the right lower lobe, with no evidence of strain on the right side of the heart or of pulmonary infarction. REVEALING

5. The aldosterone level cannot be used to rule out primary aldosteronism without a concurrent _____ of renin activity to determine the aldosterone-to-renin ratio. MEASURE

6. The development of symptoms after _____ of therapy increases the possibility of heart diseases. DISCONTINUED

7. After _____ from the hospital, the patient participated in a cardiac rehabilitation program to improve his exercise tolerance, after which he returned to work.	DISCHARGING
8. Epinephrine use was associated with increased rates of return of pulses, but _____ rates of 1-month survival and neurologically favourable survival.	DECREASE

Exercise 8. Focus on grammar: Past Simple Passive – questions.

Look at these questions and complete the rule.

Was the patient discharged from the hospital?

What valve was blood pumped into the right ventricle through?

- We make Past Simple Passive questions with:

  _____+ subject + _____ or question word + _____+ subject + _____.

Exercise 9. Ask questions to the words in bold type using Past Simple Passive.

1. **A 56-year-old female patient** was referred to our institution for atypical chest pain and palpitations.
2. The patient **was continued** on treatment for fungal infective endocarditis and **transferred** to another hospital.
3. **Automatic implantable cardioverter-defibrillator** devices were used for a wide variety of cardiac conditions including secondary prevention of sudden cardiac death for patients with a previous cardiac arrest who have sustained ventricular tachycardia, coronary artery disease, nonischemic dilated cardiomyopathy, hypertrophic cardiomyopathy, and genetic arrhythmia syndromes.
4. The symptoms were associated with some **episodes of nausea, vomiting, and loose semisolid stools.**
5. The patient was sent for evaluation to **the emergency room** by his cardiologist.
6. The patient was initially diagnosed with **viral gastroenteritis** and his symptoms of nausea, vomiting, and diarrhea resolved within 2 days.
7. Over 150,000 valve replacements **were performed** in the United States and over 80% of these procedures utilized bioprosthetic valves.

8. **Transesophageal echocardiogram** was performed showing an acute thrombosis of the bioprosthetic mitral valve with severe mitral stenosis and regurgitation.

Exercise 10. Medical vocabulary: combining forms.

Study the meaning of combining forms:

Combining forms	cardio-	tachy-	brady-	endo-
Meaning	relating to the heart	fast	slow	innermost, within

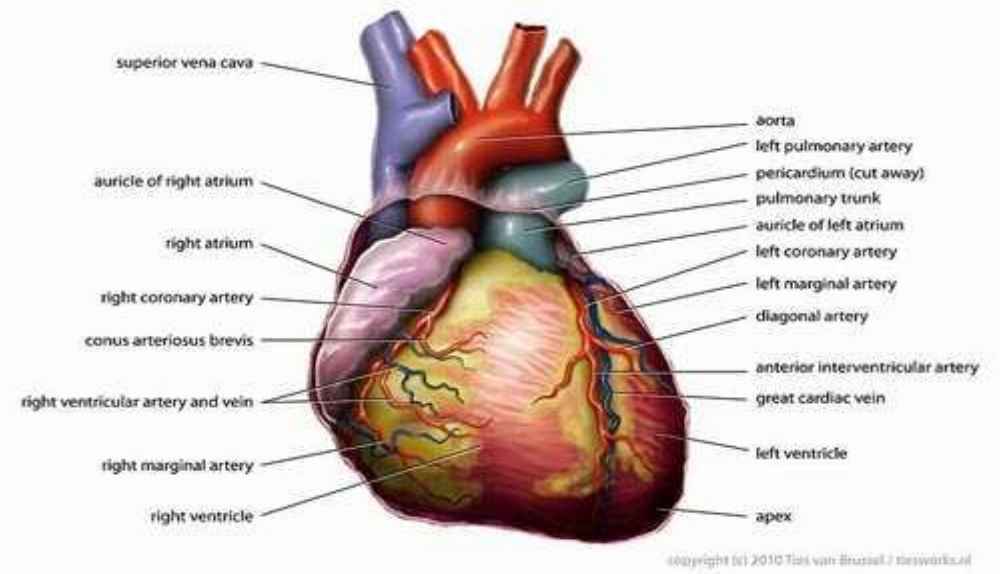
Match medical terms 1-10 to their definitions a-j.

1 cardioacceleration**,** 2 bradycardia, 3 endocarditis, 4 tachycardia, 5 tachyphylaxis, 6 bradyasystole, 7 cardiodynia, 8 cardioblast , 9 pericardiocentesis, 10 bradykinin

a) an increase in the heartbeat rate – 1 **cardioacceleration**
b) pain in the heart – _____
c) heart rate that exceeds the normal resting rate – _____
d) an embryonic cell that develops into the heart – _____
e) a condition wherein an individual has a very slow heart rate, typically defined as a resting heart rate of under 60 beats per minute (BPM) in adults – _____
f) inflammation of the inner layer of the heart – _____
g) the removal of fluid from the pericardium for therapeutic or diagnostic purposes – _____
h) a medical term describing an acute, sudden decrease in response to a drug after its administration – _____
i) a term encompassing many different types of rhythms – _____
j) an inflammatory mediator, a peptide, that causes blood vessels to dilate (enlarge), and therefore causes blood pressure to fall – _____

Supplementary Tasks

Exercise 1. Look at the picture, read the text, then watch the video on YouTube - https://www.youtube.com/watch?v=UWNL2XqF0sQ.



While it is convenient to describe the flow of the blood through the right side of the heart and then through the left side, it is important to realize that both atria contract at the same time and that both ventricles contract at the same time. The heart works as two pumps, one on the right and one on the left that works simultaneously. The right pump pumps the blood to the lungs or the pulmonary circulation at the same time that the left pump pumps blood to the rest of the body or the systemic circulation. Venous blood from systemic circulation (deoxygenated) enters the right atrium through the superior and inferior vena cava. The right atrium contracts and forces the blood through the tricuspid valve (right atrioventricular valve) and into the right ventricles. The right ventricles contract and force the blood through the pulmonary semilunar valve into the pulmonary trunk and out the pulmonary artery. This takes the blood to the lungs where the blood releases carbon dioxide and receives a new supply of oxygen. The new blood is carried in the pulmonary veins that take it to the left atrium. The left atrium then contracts and forces blood through the left atrioventricular, bicuspid, or mitral, valve into the left ventricle. The left ventricle contracts forcing blood through the aortic semilunar valve into the ascending aorta. It then branches to arteries carrying oxygen rich blood to all parts of the body.

Exercise 2. Answer the questions about the text and the film using the following diagrams:

blood flows from
blood flows through
blood flows into
blood enters
blood leaves
blood moves
blood travels from
blood returns from
blood is (then) pumped into
blood is (then) pumped through
blood out of

1. How many beats does your heart do every day?
2. What vena does blood enter the heart through?
3. Where does deoxygenated blood travel from superior and inferior vena cava?
4. Where does it move then?
5. Where does blood pass through the right and left pulmonary arteries?
6. What veins does oxygenated blood return from the lungs through?
7. What is the receiving chamber of oxygenated blood?
8. Where does blood move from left atrium past bicuspid valve?
9. What valve does blood enter the aorta through?
10. What system does blood move to the body through?
11. Let's speak about the heart walls. What are they?

Exercise 3. Translate into Ukrainian.

A 47-year-old man is brought to the emergency department 2 hours after the sudden onset of shortness of breath, severe chest pain, and sweating. He has no history of similar symptoms. He has hypertension treated with hydrochlorothiazide. He has smoked one pack of cigarettes daily for 30 years. His pulse is 110/min, respirations are 24/min, and blood pressure is 110/50 mm Hg. A grade 3/6, diastolic blowing murmur is heard over the left sternal border and radiates to the right sternal border. Femoral pulses are decreased bilaterally. An ECG shows left ventricular hypertrophy. Which of the following is the most likely diagnosis?

(A) Acute myocardial infarction

(B) Aortic dissection

(C) Esophageal rupture

(D) Mitral valve prolapse

(E) Pulmonary embolism

_____

_____

_____

_____

_____

_____

_____

_____

Exercise 4. Translate into English.

Здорова 4-річна дівчинка проходить обстеження. Систолічний шум типу 2/6 чути вздовж верхнього лівого краю грудини. S2 широко розщеплюється та не змінюється в залежності від дихання. М'який середньо-діастолічний шум прослуховується уздовж нижнього лівого краю грудини. Інші результати обстеження не вказують на будь-які відхилення від норми. Який з наступних варіантів є найбільш вірогідним діагнозом?

(A) Аортальний стеноз

(B) Дефект міжпередсердної перегородки

(C) Коарктація аорти

(D) Пролапс мітрального клапана

(E) Відкрита артеріальна протока

(F) Стеноз легеневої артерії

(G) Тетрада Фалло

(H) Транспозиція магістральних артерій

(I) Дефект міжшлуночкової перегородки

(J) Серце без патологій

_____

_____

_____

_____

_____

_____

_____

_____

Exercise 5. Study the abbreviations and write their meaning in the table.

Abbreviation	Meaning
ABPM	
ACE	
ACS	
ASD	
BP	
bpm	
CT	
ECG	
MI	
RVH	

UNIT 6

THE PATHOLOGY OF CARDIOVASCULAR SYSTEM

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the translation of the words in the table.

hypertension, *n*	[ˌhaɪpəˈtenʃən]	
accelerate, *v*	[əkˈseləreɪt]	
scar, *n*	[skɑːr]	
heart failure	[ˈfeɪljə(r)]	
engorge, *v*	[ɪnˈgɔːdʒ]	
angina pectoris	[ænˈdʒaɪnə]	
swelling, *n*	[ˈswelɪŋ]	
pulmonary edema	[ˈpʊlmənərɪˈdiːmə]	
fibrin, *n*	[ˈfɪbrɪn]	
stringy, *adj*	[ˈstrɪŋi]	
clot, clot, *v/n*	[klɒt]	
atherosclerosis, *n*	[ˌæθərəskləˈrəʊsɪs]	
plaque, *n*	[plɑːk]	
rupture, *v*	[ˈrʌptʃər]	
crack, *n*	[kræk]	
starve, *v*	[stɑːv]	
exertion, *n*	[ɪgˈzɜːʃən]	
ischemia, *n*	[ɪˈskiːmiə]	
valve, *n*	[vælv]	
chamber, *n*	[ˈtʃeɪmbə(r)]	
myocardial infarction, *n*	[ˌmaɪəˈkɑːdiəl ɪnˈfɑːkʃən]	

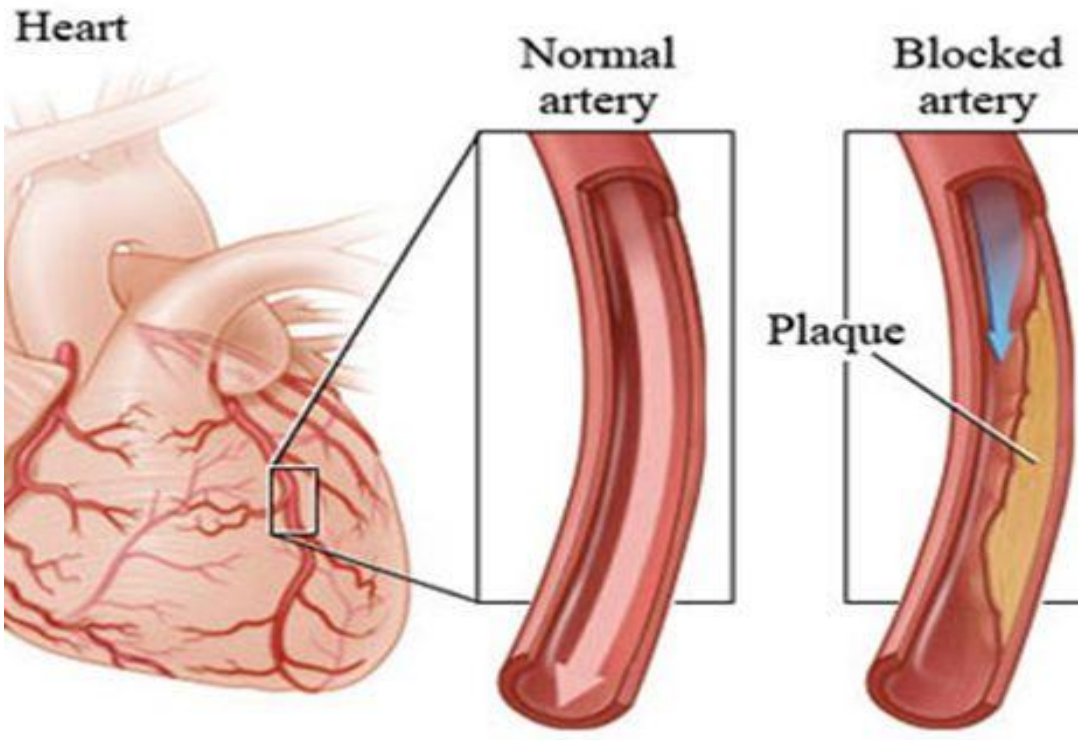
Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

1. _____ is a medical condition in which the long-term force of the blood against artery walls is chronically strong enough that may eventually cause health problems, such as heart disease.
2. _____ is a disease in which the inside of an artery narrows due to the build up of plaque.
3. _____in the arteries is a fatty, waxy substance that forms deposits in the artery wall that can narrow the artery and reduce blood flow.
4. _____is a condition characterized by reduced blood supply of the heart muscle, due to coronary artery disease (atherosclerosis of the coronary arteries).
5. _____ _____is chest pain or pressure, usually due to obstruction of blood flowto the heart muscle or spasm of the coronary arteries.
6. _____commonly known as heart attack – is the interruption of blood supply to a part of the heart, causing heart cells to die.
7. _____ _____is a condition when the heart is unable to pump enough blood to the body's tissues and results in shortness of breath, excessive tiredness, and leg swelling.
8. _____ is fluid accumulation in the tissue and air spaces of the lungs which may lead to impaired gas exchange and may cause respiratory failure.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

1. Hypertension is defined as systolic pressure over 100 and diastolic over 60 mmHg. ___
2. Atherosclerosis is characterized by plaque deposits that affect the inner lining of an artery and block the flow of blood. ___
3. Angina pectorisisusually caused by increased calcium demand when the heart is working harder than usual. ___
4. Acute myocardial infarction causes the damage to or death of part of the heart muscle. ___

5. The heart muscle affected by acute myocardial infarction if it is not treated within a few hours will recover soon and be replaced by scar tissue. ___
6. Abnormality of the lower left chamber of the heart means that the left ventricle cannot pump blood out to the body as fast as it returns from the lungs. ___
7. In right-sided heart failure, the lower right chamber of the heart (right ventricle) pumps blood to the lungs as fast as it returns from the body through the veins. ___
8. Congestive heart failure of the right ventricle often is caused by abnormalities of the heart septa and bronchial disorders. ___



https://www.carolina.com/images/teacher-resources/items/large/cardiovascular-diseases-INFOGRAPHIC.jpg

Cardiovascular disease refers to the class of diseases that involve the heart and/or blood vessels.

Hypertension is a medical condition wherein the blood pressure is chronically elevated. Hypertension is defined as systolic pressure over 140 and diastolic over 90 mmHg. As blood flows and pushes against walls, it stretches the arteries that causes microscopic tears in the arterial wall and accelerates degenerative changes.

Atherosclerosis is the hardening of arteries. It affects the inner lining of an artery and is characterized by plaque deposits that block the flow of blood. Plaques are made of fatty substances, cholesterol, waste products from the cells, calcium, and fibrin, a stringy material that helps clot blood. The inner layer of the artery wall thickens, so blood flow and oxygen delivery are decreased. Plaques can rupture or crack open, causing the sudden formation of a blood clot (thrombosis). Atherosclerosis can cause a heart attack or even it can cause a stroke.

*Myocardial ischemia*is a condition during which the heart tissue is slowly or suddenly starved of oxygen and other nutrients usually due to blockage of an artery by atherosclerosis. When blood flow is completely blocked to the heart, ischemia can lead to a heart attack. Ischemia can be silent or symptomatic. Symptomatic ischemia is characterized by chest pain called angina pectoris.

*Angina pectoris*is the chest pain due to ischemia. It is usually caused by increased oxygen demand when the heart is working harder than usual. Stable angina occurs during exertion, can be quickly relieved by resting and lasts from three to twenty minutes. Unstable angina, which increases the risk of a heart attack, occurs more frequently, lasts longer, is more severe, and may cause discomfort during rest or light exertion.

Acute myocardial infarction (AMI/MI) or heart attack is the death of or damage to part of the heart muscle because the supply of blood to an area of heart muscle is severely reduced or stopped. The blockage usually is caused by atherosclerosis, the build-up of plaque in the artery walls, and/or by a blood clot in a coronary artery.If it is not treated within a few hours, the affected heart muscle will die and be replaced by scar tissue. Often, this blockage leads to arrhythmias and may bring about sudden death.

Heart failure is a condition in which the heart has lost the ability to pump enough blood to the body's tissues. HF caused by *abnormality of the lower left chamber of the heart* (left ventricle) means that the left ventricle cannot pump blood out to the body as fast as it returns from the lungs. Because blood cannot get back to the heart, it begins to back up in the blood vessels of the lungs. Some of the fluid in the blood is forced into the breathing space of the lungs, causing pulmonary edema. A person with pulmonary edema has shortness of breath, which may be severe and life threatening. In *right-sided heart failure*, the lower right chamber of the heart (right ventricle) cannot pump blood to the lungs as fast as it returns from the body through the veins. Blood then engorges the right side of the heart and the veins. Fluid backed up in the veins is forced out into the tissues, causing swelling (edema), usually in the feet and legs. Congestive heart failure of the right ventricle often is caused by abnormalities of the heart valves and lung disorders. When the heart cannot pump enough blood, it tries to make up for this by becoming larger. When this happens, the heart chamber becomes larger and the muscle in the heart wall becomes thicker. The heart also compensates by pumping more often to improve blood output and circulation. Eventually, as the condition worsens over time, these measures are not enough to keep the heart pumping enough blood needed by the body. For most people, heart failure is a chronic disease with no cure. However, it can be managed and treated with medicines and changes in diet, exercise, and lifestyle habits.

Exercise 4.Focus on grammar: Future Simple Passive – positive and negative.

The Future Simple Passive is used to denote future action as a fact, succession of future actions, repeated actions in the future. The actions will be directed towards the subject from the person or thing expressed by the object (the doer of the action).

The Future Simple Passive is formed by means of the Future Simple of the auxiliary verb "to be" and Past Participle (Participle II) of the notional verb.

Analyze the sentences. Translate them and explain the rules.

If it is not treated within a few hours, the affected heart muscle will die and <u>will be replaced</u> by scar tissue.

The blood pressure <u>will not be normalized</u> without using medicines.

Oxygen delivery <u>will be decreased</u> due to plaque deposits that block the flow of blood.

Will the stable angina be quickly relieved by resting for 20 minutes?

In positive sentences with the subject in the 1-st person singular/plural we use _____.

In positive sentences with the subject in the 2-nd and 3-rd person singular/plural we use _____.

In negative sentences with the subject in the 1-st person singular/plural we use _____.

In negative sentences with the subject in the 2-nd and 3-rd person singular/plural we use _____.

Exercise 5. Fill in the gaps using Future Simple Passive for the verbs in brackets.

1. Angina pectoris 1_____ (to treat) by traditional medical care although some alternative therapies are known.
2. Ischemic heart disease 2 _____(to cause) by reduced blood supply to the heart.
3. The heart attack 3_____ (to provoke) by ischemia, when the blood flow is completely blocked to the heart.
4. If myocardial infarction is not treated within a few hours, the affected heart muscle 4_____(to damage) and 5_____(to replace) by scar tissue.
5. The heart failure of the right ventricle 6 _____(to observe) if the patient has abnormalities of the heart valves and lung disorders.
6. The patient7_____ (to assure) that his heart failure 8_____ (to manage)and 9_____ (to treat) with medicinesand changes in diet.
7. Heart attack 10_____ (to trigger) by many risk factors: previous cardiovascular disease, unhealthy lifestyle.
8. The risk of recurrent myocardial infarction 11_____ (to decrease) by strict blood pressure management and changes in lifestyle.

Exercise 6. Fill in the table. Check the meaning of new words in a dictionary.

verb	noun	adjective
	characterization, character	
reduce		reducible, reduced, reducing
	inflammability, inflammation	
block		blocking, blocked
normalize	abnormity, abnormality, abnormalization	
symptomize		symptomatic
shorten	short, shortness	
	management, manager	manageable, managed, managing

Exercise 7. Use the word given in capitals at the end of each line to form a word that fits in the gap in the same line.

1. Hypertension is a common disorder _____ by elevated blood pressure over the normal values of 100/60 mmHg. CHARACTER
2. When there is a _____ of blood flow to the heart of a person, then it may be a sign of ischemic heart disease. REDUCE
3. Atherosclerosis may be defined as a chronic_____ response of the blood vessels. INFLAME
4. Lack of blood flow can be due to ischemia caused by_____ or hemorrhage. BLOCK NORMALIZE
5. HF caused by _____ of the lower left chamber of the heart means that the left ventricle cannot pump blood out to the body as fast as it returns from the lungs. SYMPTOM
6. Ischemia can be silent or _____. SHORT

7. A person with pulmonary edema has _____ of breath, which MANAGE may be severe and life threatening.

8.The risk of a recurrent myocardial infarction decreases with strict blood pressure _____ and lifestyle changes.

Exercise 8. Focus on grammar: The Future Simple Passive – questions.

Look at these questions and complete the rule.

When will the blood pressure be elevated?

Why will the affected heart muscle be replaced by scar tissue?

- We make The Future Simple Passive questions with:
  question word + _____ *or* _____ + *subject* + _____.

Exercise 9. Make questions with these words. Use The Future Simple Passive. Ask and answer the questions in pairs.

1. When / the blood pressure/ elevate?
2. In what way / atherosclerosis / characterize?
3. How /symptomatic ischemia / characterize?
4. For how long /the attack of stable angina after exertion / relieve?
5. Why / the supply of blood to an area of heart muscle / severely reduce or stop?
6. On what circumstances / the affected heart muscle / replace by scar tissue?
7. Where / the swelling / causeby complications of right-sided heart failure?
8. By what disorders / the congestive heart failure of the right ventricle / often cause?

Exercise 10.Medical vocabulary: combining forms.

Study the meaning of combining forms:

Combining form	hyper-	myo-	thrombo-	peri-
Meaning	excessive, above normal	muscle	blood clot	around

Match medical terms 1-10 to their definitions a-j.

1 thrombosis, 2 hyperlipidemia, 3 periarteritis, 4 thrombophlebitis, 5 myopathy, 6 myocarditis, 7 myocardiofibrosis, 8 periarthritis, 9 hypertension, 10 pericardiectomy

a) acommon disorder characterized by elevated blood preassure persistently exceeding 140 mm Hg systolic or 90 mm Hg diastolic – **9 hypertension**
b) formation of a blood clotinside a blood vessel, obstructing the flow of blood through the circulatory system-
c) inflammation of heart muscle -
d) systemic necrozing inflammation of muscular arteries -
e) inflammation of superficial veins, usually in legs, often occurs in conjunction with thrombosis -
f) excessive amounts of lipids (cholesterol, phospholipids, triglycerides) -
g) weakening of heart muscle that diminishes cardiac function -
h) inflammation of tissues around the joint –
i) surgical removal of part or most of pericardium –
j) excess deposition of extra-cellular matrix in the cardiac muscle -

Supplementary Tasks

Exercise 1. Read the text and fill in the table.

Arteriosclerosis is the hardening of arterial walls that causes them to become thickened and brittle. This hardening results from a build-up of a plaquelike substance composed of cholesterol, lipids, and cellular debris (atheroma).Over time, it builds up on the inside lining (tunica intima) of the arterial walls. The lumen narrows as the plaque becomes larger. After a while, it becomes difficult for blood to pass through the blocked areas. Tissues distal to the occlusion become ischemic. In many instances, blood hemorrhages into the plaque and forms a clot (thrombus) that may dislodge. When a thrombus travels though the vascular system it is called an embolus (plural, *emboli*). Emboli in venous circulation may cause death. Emboli in arterial circulation commonly lodge in a capillary bed and cause localized tissue death (infarct).

Sometimes plaque weakens the vessel wall to such an extent that it forms a bulge (aneurysm) that may rupture.

Arteriosclerosis usually affects large- or medium sized arteries, including the abdominal aorta; the coronary, cerebral, and renal arteries; and major arteries of the legs (femoral arteries). One of the major risk factors for developing arteriosclerosis is an elevated cholesterol level (hypercholesterolemia). Other major risk factors include age, family history, smoking, hypertension, and diabetes.

Treatment for arthrosclerosis varies depending on the location and symptoms. In one method, occluding material and plaque are removed from the innermost layer of the artery (endarterectomy). In this procedure, the surgeon opens the site and removes the plaque, there-by resuming normal blood flow.

Coronary Artery Disease. Failure of the coronary arteries to deliver an adequate supply of blood to the myocardium is called coronary artery disease (CAD). Its major cause is the accumulation of plaque which causes the walls of the artery to harden (arteriosclerosis). With partial occlusion, localized areas of the heart experience oxygen deficiency (ischemia). When the occlusion is total or almost total, the affected area of the heart muscle dies (infarction). The clinical signs and symptoms of myocardial infarction (MI) typically include intense chest pain (angina), profuse sweating (diaphoresis), paleness (pallor), and labored breathing (dyspnea). Arrhythmia with an abnormally rapid heart rate (tachycardia) or an abnormally slow heart rate (bradycardia) may also accompany an MI. The rapid elevation of cardiac enzymes troponin T, troponin I, and creatinine kinase (CK) at predictable times following MI helps differentiate MI from pericarditis, abdominal aortic aneurysm (AAA), and acute pulmonary embolism.

When angina cannot be controlled with medication, surgical intervention may be necessary. In percutaneous transluminal coronary angioplasty (PTCA), a deflated balloon is passed through a small incision in the skin and into the diseased blood vessel. When the balloon inflates, it presses the occluding material against the lumen walls to force open the channel. After the procedure, the physician deflates and removes the balloon. Sometimes, the physician will place a hollow, thin mesh tube (stent) on the

balloon and position it against the artery wall. It remains in place after the balloon catheter is removed and keeps the artery opened.

A more invasive procedure involves rerouting blood around the occluded area using a vein graft that bypasses the obstruction (coronary artery bypass graft [CABG]). One end of the graft vessel is sutured to the aorta and the other end is sutured to the coronary artery below the blocked area. This graft reestablishes blood flow to the heart muscle.

Endocarditis is the inflammation of inner lining of the heart and its valves. It may be noninfective in nature, caused by thrombi formation, or infective, caused by various microorganisms, bacteria viral or fungal. Congenital valvular defects, scarlet fever, rheumatic fever, calcified bicuspid or aortic valves, mitral valve prolapse, and prosthetic valves are predisposing factors. Bacteria traveling in the bloodstream (bacteremia) may lodge in the weakened heart tissue and form small masses called *vegetations* composed of fibrin and platelets. Vegetations usually collect on the leaflets of the valves and their cords, causing a backflow of blood (regurgitation) or scarring. Vegetations may dislodge (embolize) and travel to the brain, lungs, kidneys, or spleen. Scaring of the valves may cause them to narrow (stenosis) or not close properly (insufficiency). Although medications may prove helpful, if heart failure develops as a result of damaged heart valves, surgery may be the only option. Whenever possible, the original valve is repaired. When the damage is extensive, a mechanical or bioprosthetic valve may be used. Patients who are susceptible to endocarditis are given antibiotic treatment to protect against infection prior to invasive procedures (prophylactic treatment).

Varicose veins are enlarged, twisted, superficial veins. They develop when the valves of the veins do not function properly (incompetent) and fail to prevent the backflow of blood. Blood accumulates and the vein becomes engorged and distended. Excess fluid eventually seeps from the vein, causing swelling in surrounding tissues (edema).Varicose veins may develop in almost any part of the body, including the esophagus (varices) and rectum (hemorrhoids), but occur most commonly in the saphenous veins of the lower legs. Types of varicose veins include reticular veins,

which appear as small blue veins seen through the skin, and "spider" veins (teleangiectases), which look like short, fine lines, starburst clusters, or weblike mazes. Varicose veins of the legs are not typically painful but if lesions open or pain is present, treatment includes laser ablation, microphlebectomies, sclerotherapy, and occasionally ligation and stripping for heavily damaged or diseased veins. The same methods are used as an elective procedure to improve the appearance of the legs. Treatment of mild cases of varicose veins includes use of elastic stockings and rest periods during which the legs are elevated.

Oncology. The most common primary tumor of the heart is composed of mucous connective tissue (myxoma); however, these tumors tend to be benign. Some myxomas originate in the endocardium of the heart chambers, most arise in the left atrium. Occasionally, they impede mitral valve function and cause a decrease in exercise tolerance, dyspnea, fluid in the lungs (pulmonary edema), and systemic problems, including joint pain (arthralgia), malaise, and anemia. These tumors are usually identified and located by two dimensional echocardiography. When present, they should be excised surgically. Most malignant tumors of the heart are the result of a malignancy originating in another area of the body (primary tumor) that has spread (metastasized) to the heart. The most common type originates in a darkly pigmented mole or tumor (malignant melanoma) of the skin. Other primary sites of malignancy that metastasize to the heart are bone marrow and lymphatic tissue. Treatment of the metastatic tumor of the heart involves treating of the primary tumor.

Condition	Symptoms	Treatment
Arteriosclerosis		
Coronary artery disease		
Endocarditis		

Varicose veins		
Oncology		

Exercise 2. Read the text below and decide which answer A, B, C of D best fits each space.

The Pathology of Cardio-vascular System

Many cardiac disorders, especially coronary artery 1_____and valvular 2._____are 3._____with a genetic predisposition. Thus, a complete history as well as a physical 4_____ is 5_____ in the diagnosis of cardiovascular disease. Although some of the most serious cardiovascular diseases have few 6_____ and symptoms, when they occur , they may include 7_____ pain (angina), palpitations, 8_____ difficulties (dyspnea), cardiac irregularities (arrhythmias) and loss of 9_____(syncope). The location, duration, pattern of radiation, and severity of pain are important qualities in differentiating the various forms of cardiovascular disease and 10_____ and noninvasive tests are usually required to confirm or rule out a 11_____ disease. For diagnosis, treatment, and management of cardiovascular disorders, the medical services of a specialist may be warranted. Cardiology is the medical specialty 12_____ with disorders of the cardiovascular system. The physician who treats these disorders is called a cardiologist.

1	A malady	B disease	C accident	D affliction
2	A disorders	B infections	C abnormalities	D disturbances
3	A connected	B associated	C involved	D related
4	A review	B exploration	C expertise	D examination
5	A valuable	B fundamental	C essential	D considerable
6	A signs	B marks	C indications	D traits
7	A breast	B stomach	C neck	D chest

8	A inhalating	B watching	C breathing	D hearing
9	A mentality	B mind	C consciousness	D perception
10	A agressive	B violant	C invasive	D subcutaneous
11	A suspected	B supposed	C imagined	D assumed
12	A related	B preoccupied	C interested	D concerned

Exercise 3. Translate into Ukrainian.

A 62-year-old man comes to the physician because of a 2-month history of progressive fatigue and ankle swelling. He had an anterior myocardial infarction 3 years ago and has had shortness of breath with mild exertion since then. Current medications include labetalol and daily aspirin. He has smoked one-half pack of cigarettes daily for 30 years. His pulse is 100/min and regular, respirations are 20/min, and blood pressure is 130/75 mm Hg. There are jugular venous pulsations 5 cm above the sternal angle. Crackles are heard at both lung bases. Cardiac examination shows an S3 gallop. There is edema from the midtibia to the ankle bilaterally. Further evaluation of this patient is most likely to show which of the following findings?

(A) Decreased pulmonary capillary wedge pressure

(B) Impaired contractility of the left ventricle

(C) Prolapse of the mitral valve

(D) Thrombosis of the superior vena cava

(E) Ventricular septal defect

Exercise 4. Translate into English.

47-річного чоловіка доставлено до відділення невідкладної допомоги через 2 години після раптового нападу задишки, сильного болю у грудях та пітливості. Подібних симптомів у нього в анамнезі не було. Він хворіє на гіпертензію, яку лікує гідрохлоротіазідом, викурює одну пачку цигарок на день протягом останніх 30 років. При обстеженні - пульс 110/хв., частота дихання 24/хв., артеріальний тиск 110/50 мм рт.ст. При аускультації по лівому краю груднини вислуховується дуючий діастолічний шум 3/6 ступеню з іррадіацією в правий край груднини. Пульсація стегнових артерій ослаблена з обох боків. На ЕКГ - гіпертрофія лівого шлуночка. Що з наступного є найбільш вірогідним діагнозом?

(A) Гострий інфаркт міокарда

(B) Розшарування аорти

(C) Розрив стравоходу

(D) Пролапс стулок мітрального клапану

(E) Легенева емболія

_____

_____

_____

_____

_____

_____

_____

_____

Exercise 5. Study the abbreviations and write their meaning in the table.

Abbreviation	Meaning
AS	
ASHD	
CABG	
CAD	
CK	
DVT	
HTN	
HF	
MVP	
PTCA	

UNIT 7

CHEMICAL PROCESSES OF DIGESTION

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the translation of the words in the table.

agent, *n*	[ˈeɪdʒənt]	
enzyme, *n*	[ˈenzaɪm]	
continuously, *adv*	[kənˈtɪnjʊəslɪ]	
carbohydrate, *n*	[ˈkɑːbəuˈhaɪdreɪt]	
amylase, *n*	[ˈæmɪˌleɪz]	
starch, *n*	[stɑːtʃ]	
convert, *v*	['kɔnvɜːt]	
line, *v*	[laɪn]	
intrinsic, *adj*	[ɪnˈtrɪnsɪk]	
constituent, n	[kənˈstɪtjuənt]	
forerunner, *n*	[ˈfɔːˌrʌnə]	
villus, *n* *pl.* villi	[ˈvɪləs] [ˈvɪlʌɪ]	
chyme, n	[kaɪm]	
globule, *n*	[ˈglɒbjuːl]	
maltose, *n*	[ˈmɔːltəus]	
protease, *n*	[ˈprəʊtɪˌeɪs]	
lactose, *n*	[ˈlæktəus]	
intolerance, *n*	[ɪnˈtɔlərəns]	

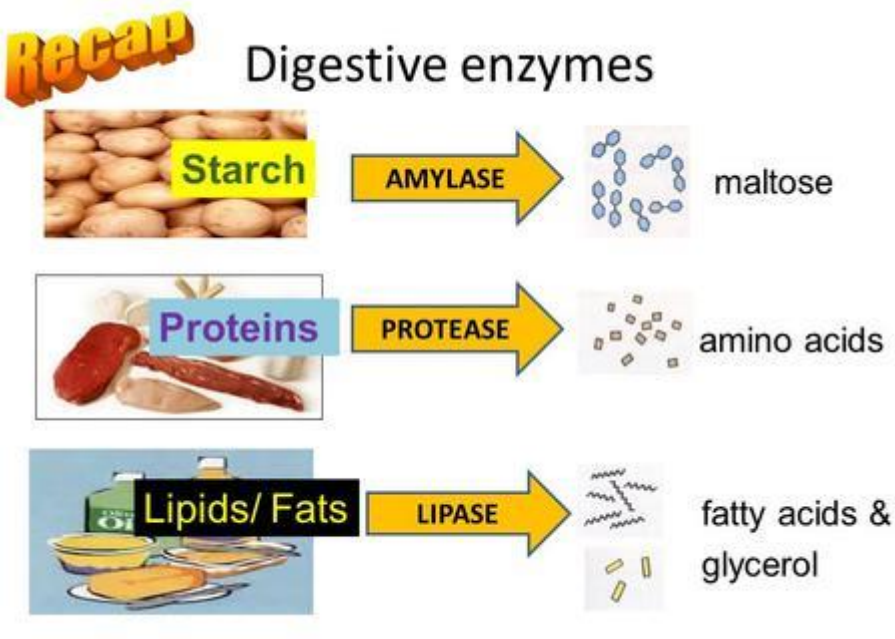
Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

1. Bile contains bile salts which interact with fat _____ and divide them into smaller droplets.
2. Digestive _____ aid in digestive processes, which are the reactions that break food molecules into smaller pieces prior to absorption.

3. Enzymes break _____ into pieces called monosaccharides.
4. Iodine solution can be used to test if there is _____ present in food.
5. When a substance binds to the enzyme, the enzyme will then react to _____ the substance into product.
6. Starch is broken down into _____ by amylase in saliva.
7. Complex proteins are broken down into simpler proteins by _____ found in gastric juices secreted by the stomach.
8. The _____ in the small intestines play an important role in the absorption of nutrients.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

1. The main places where chemical digestion happens are the mouth, stomach and large intestine. ___
2. The mouth begins the process of carbohydrate digestion through the action of saliva. ___
3. Food stays in the stomach for approximately 5-6 hours. ___
4. Villi have cells that produce intestinal enzymes which complete the digestion of peptides and sugars. ___
5. Most of the food absorption doesn't take place in the jejunum and the ileum. ___
6. Lipases break down fats into fatty acids and glycerol. ___
7. Salivary amylase functions best at pH 7 or 8. ___
8. The chemical digestion that begins in the small intestine is a result of pancreatic secretions. ___



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The gastrointestinal system is responsible for the breakdown and absorption of various foods and liquids. Many different organs have essential roles in the digestion food. Chemical digestion starts in the mouth and continues into the intestines. In chemical digestion, food is broken down by the action of chemical agents. They are the following: enzymes, acids and bile. Several different enzymes break down macromolecules into smaller molecules the body can use.

The main places where chemical digestion happens are the mouth, stomach and small intestine. In the mouth food mixes with saliva and begins the process of carbohydrate digestion through the action of saliva. The enzyme, salivary amylase, starts the chemical digestion of starch, converting it from a polysaccharide to the disaccharide maltose.

The stomach starts chemical digestion of protein. Secretions from the stomach lining consist of about two liters of hydrochloric acid, pepsin, and other fluids. A very important constituent of gastric juices is pepsinogen. It is not an enzyme but a forerunner of the enzyme pepsin. The hydrochloric acid increases the acidity of the stomach contents to a pH of 2 or lower. And then pepsinogen is converted to pepsin, an active enzyme which begins the chemical digestion of proteins into peptides. Salivary amylase functions best at pH 6 or 7. It breaks starches down adding a water molecule into the starch compound. Therefore, it becomes inactive when it reaches the stomach. Food stays in the stomach for approximately 3-4 hours and moves through another sphincter muscle to pass into the small intestine.

The small intestine is the site where most of the chemical digestion is carried out. Projections called villi line the small intestine which absorbs digested food into the capillaries. Most of the food absorption takes place in the jejunum and the ileum. The function of a small intestine is the digestion of proteins into peptides and amino acids principally occurs in the stomach but some also occurs in the small intestine. The chemical digestion that begins in the small intestine is a result of pancreatic secretions. Starch and glycogen are broken down into maltose through the action of pancreatic amylase. Proteases continue the breakdown of protein that began in the stomach. Lipases break down fats into fatty acids and glycerol.

Finally, the villi in the small intestine itself release enzymes. They complete the digestive process. Maltase, lactase, and sucrase are three enzymes which break down the maltose, sucrose and lactose into monosaccharides. Lactose intolerance results from a lack of the enzyme lactose. Peptidase breaks down peptides into amino acids, nuclease - nucleic acids into sugars and nitrogen bases.

Exercise 4. Focus on grammar: Present Perfect – positive and negative.

Present Perfect is used for actions which started in the past and are still happening.

Look at these sentences and complete the rules.

Researchers have already studied how the enzyme interacts with its product.

The breakdown of the two starch-forming polysaccharides amylose and amylopectin has led to the formation of the disaccharide maltose.

Recent study has not shown the risk of symptoms after lactose ingestion.

In the past decade, I've not seen a growing number of patients who for years have limited sugary foods.

- In positive sentences with *I, we, you, they* or *plural nouns* we use _____+ past participle.
- In positive sentences with *he, she it* or *singular nouns* we use ____ + past participle.
- In negative sentences with *I, we, you, they* or *plural nouns* we use _____+ past participle.
- In negative sentences with *he, she it* or *singular nouns* we use _____+ past participle.

Exercise 5. Fill in the gaps with the Present Perfect of the verbs in brackets.

1. However, several studies _____ (fail) to find evidence for a disaccharidase-related transport system to be involved in the absorption of sucrose or maltose.
2. Interestingly, our laboratory recently _____ (show) that, when a mixture of glucose and fructose is ingested at high rates (1.8 g/min) during cycling exercise, exogenous CHO oxidation rates can reach peak values of ~1.3 g/min.
3. Recent studies _____ (show) the practice of drinking water immediately after or before a meal severely hinders digestion by diluting the essential gastric juices and digestive enzymes.
4. Moreover, the traditional starch based diets of some developing nations likely _____ (contribute) to rising risk of chronic disease.
5. Residents in places associated with extreme longevity traditionally _____ (consume) high carbohydrate diets, although associated healthy lifestyle factors may confound a causal interpretation.

6. We _____ (show) in the present study that hydrochloric acid infusion sensitized the stomach to isobaric but not isovolumetric distensions in fasting healthy subjects.

7. This _____ (lead) some to speculate that sucrose compared with glucose ingestion may be particularly effective at maintaining or increasing liver glycogen during exercise.

8. In the past 10 years, studies from many laboratories _____ (clarify) the process of disaccharide hydrolysis in the intestine.

Exercise 6. Fill in the table. Check the meaning of new words in a dictionary.

verb	noun	adjective
		emulsifiable, emulsible
complete		
	digestion	
produce		
		absorbable
release		
	secretion	
		active
continue		
	conversion	
	combination	
destroy		

Exercise 7. Use the word given in capitals at the end of each line to form a word that fits in the gap in the same line.

1. Bile helps in the _____ of fats for absorption of fatty acids. EMULSIFY

2. Digestion begins in the mouth with the _____ of saliva and its digestive enzymes. SECRETE

3. The _____ system is responsible for breaking down the food we eat into nutrients our body needs and forming a bacterial balance within the digestive tract.	DIGEST
4. The _____ of iron from food is dependent on gastrointestinal conditions in the host and on intrinsic food-based factors.	ABSORB
5. How you _____ foods can majorly impact the benefit you get from them: increasing the absorption of important nutrients and boosting the effectiveness of antioxidants.	COMBINATION
6. The _____ of the aliment into fat is not properly nutrition.	CONVERTIVE
7. Mucus is secreted by the stomach, providing a slimy layer that _____ as a shield against the damaging effects of the chemicals.	ACTIVE
8. The presence of fat in the small intestine produces hormones that stimulate the _____ of pancreatic lipase from the pancreas.	RELEASABLE

Exercise 8. Focus on grammar: Present Perfect – questions.

Look at these questions and complete the rule.

What have capillaries within the villi absorbed?

Where has food undergone chemical digestion?

- We make Present Perfect questions with:

question word + _____ or _____ + subject + _____.

Exercise 9. Put the questions to the underlined words. Use Present Perfect.

1. Recent studies have shown <u>the risk of symptoms after lactose ingestion</u>.
2. This review has summarized <u>the genetic basis, diagnosis, and treatment of lactose malabsorption and intolerance</u>.
3. A recent conference has defined <u>lactose intolerance as ‘the onset of gastrointestinal symptoms following a blinded, single-dose challenge of ingested lactose by an individual with lactose malabsorption</u>.
4. These findings have demonstrated <u>a high frequency of placebo response to lactose in patients referred for investigation of digestive symptoms</u>.

5. Treatment options of lactose intolerance have included lactose-reduced diet and enzyme replacement.
6. In previous study we have investigated the impact of native chicory inulin on sucrose digestibility after a long term feeding and after an acute intake.
7. Observational studies have reported improvement of abdominal complaints, with lactose restriction in up to 85% of patients with lactose malabsorption.
8. The study has addressed the safety and effectiveness of calcium replacement for patients with lactose intolerance.

Exercise 10. Medical vocabulary: combining forms.

Study the meaning of combining forms:

Combining form	anti-	mal-	hydro -	micro-
Meaning	opposed to; against	badly; wrongly	water	very small

Match medical terms 1-10 to their definitions a-j.

1 antioxidant, 2 hydrolysis, 3 malnutrition, 4 microorganism, 5 microdose, 6 antifungal, 7 malabsorption, 8 microflora, 9 hydrochloride, 10 antihormonal

a) any substance that inhibits oxidation - **1 antioxidant**
b) faulty absorption especially of nutrient materials from the gastrointestinal tract - _____
c) a chemical substance that is a combination of a metal or base with hydrochloric acid - _____
d) an organism of microscopic or ultramicroscopic size - _____
e) faulty nutrition due to inadequate or unbalanced intake of nutrients or their impaired assimilation or utilization- _____
f) inhibiting the growth of fungi - _____
g) a small or strictly localized flora -_____
h) an extremely small dose - _____

i) blocking or inhibiting the effect or production of a hormone - _____

j) a chemical reaction in which one substance reacts with water to produce another - _____

Supplementary Tasks

Exercise 1. Read the text.

Enzymatic Digestion

Enzymatic digestion is responsible for breaking organic material into smaller subunits that can be absorbed into the circulatory system. The amount of enzymatic digestion within the oral cavity is small in comparison to the activity of the lower GI tract. However, there is some initial digestion of both carbohydrates and lipids in the oral cavity. The salivary glands, primarily the submandibular and sublingual glands, secrete an enzyme called salivary amylase. Recall that the nutrients are primarily absorbed from the digestive system in their simplest structure, or monomers. Salivary amylase belongs to a class of enzymes that digest complex carbohydrates, such as starch, into monosaccharides. The monosaccharides are easily absorbed into the circulatory system, although little absorption occurs in the oral cavity. The salivary amylase is mixed into the food by the action of the tongue and cheeks and continues to break down the starches in the food for about an hour until deactivated by the acidic pH of the stomach. A second enzyme of the oral cavity is lingual lipase. Lingual lipase is secreted from glands on the surface of the tongue. This enzyme acts on triglycerides in the food, breaking them down into monoglycerides and fatty acids. However, the action of this enzyme is relatively minor and it does not make a major contribution to overall lipid digestion.

The food was mixed in the oral cavity with saliva, which contains salivary amylase. The chemical digestion of complex carbohydrates in the bolus continues down the esophagus. After the bolus passes through the gastroesophageal sphincter and enters the stomach, it comes in contact with the highly acidic hydrochloric acid. While hydrochloric acid inactivates salivary amylase, the lack of a significant amount of mechanical digestion in the fundus and upper regions of the body of the stomach allows

the salivary amylase to continue carbohydrate digestion within the bolus. However, once mechanical digestion begins lower in the stomach, the salivary amylase is quickly inactivated. The thick mucus coating of the stomach prohibits the absorption of digested carbohydrates into the bloodstream. In the oral cavity, the enzyme lingual lipase initiated a limited digestion of triglycerides in the food. In the stomach, the chief cells also release a gastric lipase, which serves much the same function in breaking down triglycerides. As was the case with the carbohydrates in the oral cavity and stomach, this is not a major contribution to the overall digestion of these nutrients, and there is no appreciable absorption of triglycerides through the stomach lining.

The prime nutrient target of enzymatic digestion in the stomach is protein. Recall from earlier in this chapter that proteins may be large molecules, and all contain multiple levels of complex organization. This three dimensional structure of proteins, and the presence of peptide bonds holding the amino acids together, makes proteins a difficult class of nutrients to digest. The purpose of protein digestion in the stomach is to initialize the process by destabilizing the structure of the protein. Thus, the mechanisms of protein digestion in the stomach are very general, and not directed at one specific type of protein. As was the case with carbohydrates, there is no absorption of peptides or amino acids through the lining of the stomach.

Enzymes that are involved in protein digestion belong to the general class called proteases. The pepsinogen secreted by the chief cells in the gastric pits is initially inactive, so as to protect the cells of the gastric pit from unintentional digestion. After being secreted, the pepsinogen makes its way through the protective mucus coat and into the main cavity, or lumen, of the stomach. The hydrochloric acid in the lumen activates the pepsinogen by cleaving off a small fragment from one end of the molecule. This active form of the enzyme is called pepsin. Pepsin also has the ability to activate pepsinogen in what is frequently called an autocatalytic process. Once activated, pepsin breaks down some proteins into smaller peptide fragments for further digestion later in the small intestine.

Exercise 2. Look at the Table. Name all products secreted by the organs of digestive tract and accessory organs. What are their actions?

Organ	Main Digestive Juices Secreted	Action
Salivary glands		
Stomach		
Small intestine		
Pancreas		
Liver		

Exercise 3. Translate into Ukrainian.

A newborn child suffers from milk curdling in stomach, this means that soluble milk proteins (caseins) transform to insoluble proteins (paracaseins) by means of calcium ions and a certain enzyme. What enzyme takes part in this process?

A. Pepsin

B. Renin

C. Lipase

D. Secretin

E. Gastrin

_____

_____

_____

_____

_____

_____

_____

_____

Exercise 4. Translate into English.

Пацієнт має критичне погіршення травлення білків, жирів та вуглеводів. Швидше за все, це викликано низькою секрецією наступного травного соку:

A. Кишковий сік

Б. Жовч

C. Панкреатичний сік

D. Шлунковий сік

E. Слина

_____

_____

_____

_____

_____

_____

_____

_____

Exercise 5. Study the abbreviations and write their meaning in the table.

Abbreviation	Meaning
GI	
HCl	
CHO	
CCK	
GIP	
Na	
H	
pc, p.c	
a.c.	

UNIT 8

ANATOMY AND PHYSIOLOGY OF DIGESTIVE SYSTEM

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the translation of the words in the table.

accessory, *adj*	[ək'ses(ə)rɪ]	
beneath, *prep*	[bɪ'niːθ]	
buccal, *adj*	[ˈbʌkəl]	
carry out, *v*	['kærɪ aut]	
commencement, *n*	[kə'men(t)smənt]	
curvature, *n*	['kɜːvətʃə]	
enclose, *v*	[ɪn'kləuz]	
entry, *n*	['entrɪ]	
extent, *n*	[ɪk'stent]	
facilitate, *v*	[fə'sɪlɪteɪt]	
flap, *n*	[flæp]	
innermost, *adj*	['ɪnəməust]	
mesentery, *n*	['mes(ə)ntərɪ]	
minor, *adj*	['maɪnə]	
mixture, *n*	['mɪkstʃə]	
mobility, *n*	[mə(u)'bɪlətɪ]	
outermost, *adj*	['autəməust]	
passageway, *n*	['pæsɪdʒweɪ]	
significantly, *adv*	[sɪg'nɪfɪkəntlɪ]	

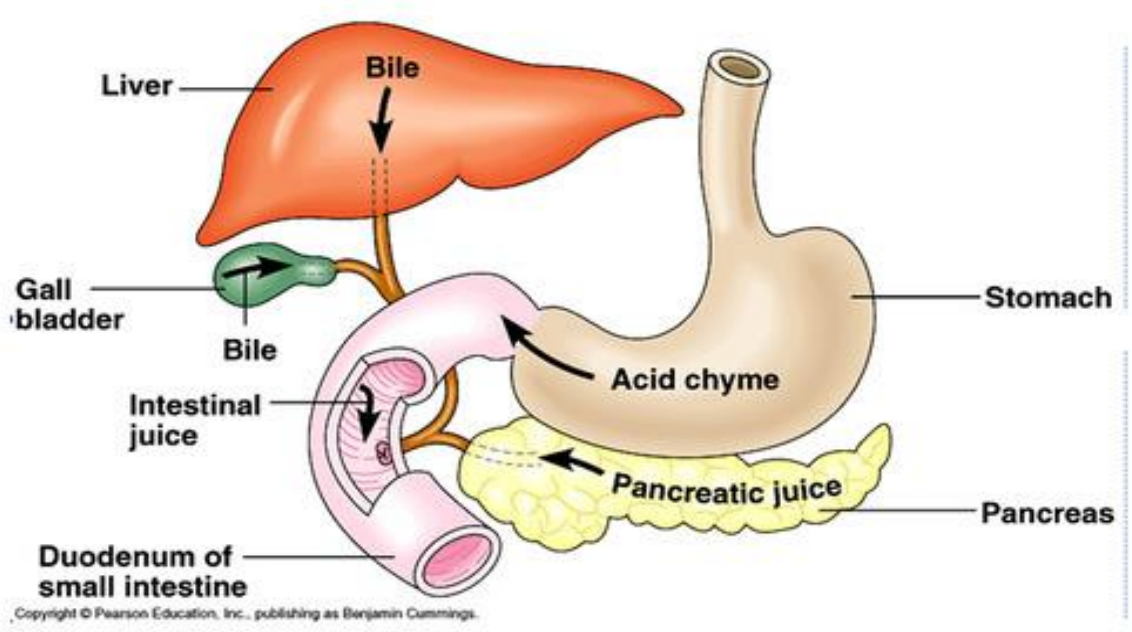
Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

1. A _____is an organic or inorganic substance made from a combination of liquid or solid substances.
2. A_____ is a narrow hollow part of the body through which air or food goes.
3. A_____ is a small part of skin that closes the passage.

4. A _____ is any normal or abnormal bending of internal organs or body parts.
5. ___ is an inner part of oral cavity which is situated on the cheeks.
6. ____ is the capacity or ability to move easily or be freely moved through passages.
7. ___ is the deepest layer of something.
8. ___ is the position of thing or organ under something.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

1. The digestive system is under the control of the brain._____
2. The buccal cavity is the entry point into the human digestive system._____
3. The stomach is a thin walled organ that lies between the esophagus and the second part of the small intestine._____
4. The stomach is divided into four sections: cardiac region, bottom, body and atrium._____
5. The functions and the structure of the small and large intestines are the same._____
6. The jejunum is a part of the colon, located between the distal end of duodenum and the proximal part of ileum. _____
7. The serosa, muscularis externa, submucosa, and muscosa are four major tissues within the walls of GI tract._____
8. The esophagus or gullet is the muscular tube in insects through which air passes._____



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The human digestive system is actually a series of organs that form a long, enclosed tube. The digestive system is partially under the control of the nervous system, but also is influenced by the hormones secreted by the endocrine system.

From the esophagus to the anus, the walls of the digestive tract have the same general structure, with minor variations in each organ to enable specific functions. Within the wall of the digestive tract are four major tissue layers. From outermost to innermost, they are the serosa, muscularis externa, submucosa, and muscosa.

The gastrointestinal (GI) tract is frequently divided into two major sections. The upper GI tract consists of the oral cavity, esophagus, and stomach, as well as associated valves and accessory organs. The lower GI tract consists primarily of the small intestine and colon.

The human mouth, also called the oral cavity or buccal cavity, is the entry point into the human digestive system. It is the site of both mechanical and enzymatic digestive processes. Vital to the digestive functions of the oral cavity are the secretions of three pairs of accessory glands collectively called the salivary glands. Saliva, the

chemical secretion of the salivary glands, is actually a complex mixture that performs a variety of functions for the digestive system, one of them is swallowing.

Swallowing your food happens when the muscles in your tongue and mouth move the food into your pharynx. The pharynx, which is the passageway for food and air, is about five inches long. A small flap of skin called the epiglottis closes over the pharynx to prevent food from entering the trachea and thus choking. The esophagus or gullet is the muscular tube in vertebrates through which ingested food passes from the throat to the stomach.

The stomach is a thick walled organ that lies between the esophagus and the first part of the small intestine (the duodenum). It is on the left side of the abdominal cavity. Lying beneath the stomach is the pancreas. The stomach is divided into four sections: 1) cardiac region, where the contents of the esophagus empty into the stomach, 2) fundus, formed by the upper curvature of the organ, 3) body, the main central region, and 4) pylorus or atrium, the lower section of the organ that facilitates emptying the contents into the small intestine.

The small intestine is the site where most of the chemical and mechanical digestion is carried out. In anatomy of the digestive system, the duodenum is a hollow jointed tube connecting the stomach to the jejunum. It is the first and shortest part of the small intestine. The jejunum is a part of the small bowel, located between the distal end of duodenum and the proximal part of ileum. The jejunum and the ileum, the last part of the small intestine, are suspended by an extensive mesentery giving the bowel great mobility within the abdomen.

The large intestine extends from the end of the ileum to the anus. Because the majority of the large intestine is comprised of the colon, the term colon is frequently used as a common name for the large intestine. It is about 5 feet long, being one-fifth of the whole extent of the intestinal canal. Its caliber is largest at the commencement at the cecum, and gradually diminishes as far as the rectum. The large intestine is vastly shorter than the small intestine and differs significantly both in anatomy and function. The large intestine is divided into the cecum, colon, rectum, and anal canal.

Exercise 4. Focus on grammar: Present Perfect Passive – positive and negative.

Present Perfect Passive is used to describe and emphasize processes or phenomena rather than who or what is responsible for it.

Look at these sentences and complete the rules.

Analgesics and ibuprofen have been prescribed.

A 26-year-old man has been admitted to the emergency department with abdominal pain.

The diagnoses of nonalcoholic fatty liver disease and Gilbert's syndrome have not been made earlier.

The pain has not been followed by an episode of nonbloody, nonbilious emesis.

- In positive sentences with *I, we, you, they* or *plural nouns* we use _____+ past participle.
- In positive sentences with *he, she it* or *singular nouns* we add _____ + past participle.
- In negative sentences with *I, we, you, they* or *plural nouns* we use _____ + past participle.
- In negative sentences with *he, she it* or *singular nouns* we use _____ + past participle.

Exercise 5. Fill in the gaps with the correct form of the verbs in brackets.

1. A 26-year-old man _____(admit) to the emergency department with abdominal pain, nausea, and vomiting.
2. The patient reports that he _____ (have) intermittent pain in the right upper and right lower quadrants of the abdomen for 6 weeks.
3. The pain increases by bending and usually it relieves within 2 hours after antacids _____ (take).
4. Since the age of 24 the patient _____(diagnose) whith isolated indirect hyperbilirubinemia.
5. Slime, blood and protozoa 30-200 microns of length _____ (reveal) in a man's feces.

6. A 44 year old man reports that he ____(not use) tobacco or recreational drugs recently and that he ___(drink) never alcohol.
7. A journalist's body temperature _____ sharply _____(increase) in the morning three weeks after his mission in India.

Exercise 6. Fill in the table. Check the meaning of new words in a dictionary.

verb	noun	adjective
	admission	admitted
diagnose		diagnosable, diagnosing, diagnosed
	report	
	bending	bendable
pain	pain	
follow		following, followed
vomit		vomited
associate	association	
recreate		recreational
direct	direction	

Exercise 7. Use the word given in capitals at the end of each line to form a word that fits in the gap in the same line.

1. A 26-year-old man has been _____ to the emergency department. ADMISSION
2. A new test has been used in _____colon cancer. DIAGNOSIS
3. Bad health condition is a _____ result of unhealthy diet and smoking DIRECTION
4. Dull discomfort in the right upper quadrant has been_____ with Gilbert's syndrome. ASSOCIATION
5. A _____will take a long time after such a complicated operation. RECREATE
6. The pain in the upper abdominal part is getting worse in a_____ condition. BEND
7. Colonoscopy is very _____ procedure. PAIN

8. The surgery of small intestine has been _____by a good nutrition FOLLOWER and physical exercises.

Exercise 8. Focus on grammar: Present Perfect Passive– questions.

Look at these questions and complete the rule.

What medicines have been prescribed by the doctor?

Where has the patient with severe abdominal pain been admitted?

- We make Present Perfect Passive questions with:

question word + _____ *or* _____ + *subject* + _____.

Exercise 9. Make questions with these words. Use Present Perfect Passive.

Ask and answer the questions in pairs.

1. Who / discharge from / hospital / in good health condition?
2. Why / colonoscopy / use by / the gastroenterologists?
3. How / perforated appendicitis / diagnose?
4. What mechanisms / of complications / explore?
5. Where / the diffuse inflammation / reveal / with the abdominal CT scan?
6. What diagnosis / make / by the surgeon?
7. Why / the presence / of / peritonitis / not explain?
8. Which / procedures / introduce by / recently / professors?

Exercise 10. Medical vocabulary: combining forms.

Study the meaning of combining forms:

Combining forms	lapar(o)-	gastro-	oesophago-	- pepsia
Meaning	the flank, loin or abdominal wall.	stomach	gullet	a state of the digestion

Match medical terms 1-10 to their definitions a-j.

1. laparectomy, 2. gastrocolic, 3. dyspepsia, 4. laparorrhaphy, 5. oesophagus, 6. oesophagitis, 7. eupepsia, 8. gastroscope, 9. apepsia, 10. gastrorrhea

a) tissue removal from abdominal walls - **1. laparectomy**
b) repairing of the abdominal wall - _____
c) a medical tool used for the examination of the stomach - _____
d) relating to the large intestine - _____
e) the inflammation followed by swelling and pain in the gullet - _____
f) an upper part of the gastrointestinal tract - _____
g) good digestion - _____
h) too much gastric juice in the stomach - _____
i) synonym to indigestion - _____
j) a physical state characterized by poor digestion - _____

Supplementary Tasks

Exercise 1. Read the text and fill in the table.

The stomach

The stomach is commonly recognized as a muscular sac that functions as a holding site for food before it enters into the small intestine, as well as the location where the food is mixed and partially digested by mechanical processes. However, while the stomach does perform these functions, in actuality, its physiology and role in the digestive process is much more complex.

A mucous membrane lines the stomach which contains glands that secrete gastric juices, up to three quarts of this digestive fluid is produced daily. The gastric glands begin secreting before food enters the stomach due to the parasympathetic impulses of the vagus nerve, making the stomach also a storage vat for that acid.

The secretion of gastric juices occurs in three phases: cephalic, gastric, and intestinal. The cephalic phase is activated by the smell and taste of food and swallowing. The gastric phase is activated by the chemical effects of food and the

distension of the stomach. The intestinal phase blocks the effect of the cephalic and gastric phases. Gastric juice also contains an enzyme named pepsin, which digests proteins, hydrochloric acid and mucus. Hydrochloric acid causes the stomach to maintain a pH of about 2, which helps kill off bacteria that comes into the digestive system via food.

The gastric juice is highly acidic with a pH of 1-3. It may cause or compound damage to the stomach wall or its layer of mucus, causing a peptic ulcer. On the inside of the stomach there are folds of skin call the gastric rugae. Gastric rugae make the stomach very extendable, especially after a very big meal.

After receiving the bolus (chewed food) the process of peristalsis is started; mixed and churned with gastric juices the bolus is transformed into a semi-liquid substance called chyme. Stomach muscles mix up the food with enzymes and acids to make smaller digestible pieces. The pyloric sphincter, a walnut shaped muscular tube at the stomach outlet, keeps chyme in the stomach until it reaches the right consistency to pass into the small intestine. The food leaves the stomach in small squirts rather than all at once.

Water, alcohol, salt, and simple sugars can be absorbed directly through the stomach wall. However, most substances in our food need a little more digestion and must travel into the intestines before they can be absorbed. When the stomach is empty it is about the size of one fifth of a cup of fluid. When stretched and expanded, it can hold up to eight cups of food after a big meal.

Like the other parts of the gastrointestinal tract, the stomach walls are made of a number of layers. From the inside to the outside, the first main layer is the mucosa. This consists of an epithelium, the lamina propria underneath, and a thin bit of smooth muscle called the muscularis mucosa. The submucosa lies under this and consists of fibrous connective tissue, separating the mucosa from the next layer, the muscularis externa. The muscularis in the stomach differs from that of other GI organs in that it has three layers of muscle instead of two. Under these muscle layers is the adventitia, layers of connective tissue continuous with the omenta.

The epithelium of the stomach forms deep pits, called fundic or oxyntic glands. Different types of cells are at different locations down the pits. The cells at the base of these pits are chief cells, responsible for production of pepsinogen, an inactive precursor of pepsin, which degrades proteins. The secretion of pepsinogen prevents self-digestion of the stomach cells. Further up the pits, parietal cells produce gastric acid and a vital substance, intrinsic factor. The function of gastric acid is two fold 1) it kills most of the bacteria in food, stimulates hunger, and activates pepsinogen into pepsin, and 2) denatures the complex protein molecule as a precursor to protein digestion through enzyme action in the stomach and small intestines. Near the top of the pits, closest to the contents of the stomach, there are mucous-producing cells called goblet cells that help protect the stomach from self-digestion.

The muscularis externa is made up of three layers of smooth muscle. The innermost layer is obliquely-oriented: this is not seen in other parts of the digestive system: this layer is responsible for creating the motion that churns and physically breaks down the food. The next layers are the square and then the longitudinal, which are present as in other parts of the GI tract. The pyloric antrum which has thicker skin cells in its walls and performs more forceful contractions than the fundus. The pylorus is surrounded by a thick circular muscular wall which is normally tonically constricted forming a functional (if not anatomically discrete) pyloric sphincter, which controls the movement of chyme. The stomach needs only to push food into the small intestine when the intestine is not busy. While the intestine is full and still digesting food, the stomach acts as a storage for food.

Secreted chemicals	Gastric glands	Location	Functions
Gastric acid A vital substance			

Mucous			
Serotonin Histamine			
Hormone gastrin		.	
Pepsinogen			

Exercise 2. Read the text below and decide which answer A, B, C of D best fits each space.

Gallbladder

The gallbladder is a pear shaped organ that 1 _____about 50 ml of bile until the body 2 _____ it for digestion. The gallbladder is about 7-10cm 3 _____ in humans and is dark green in appearance due to its contents, not its tissue. It is 4 _____ to the liver and the duodenum by biliary tract.

The gallbladder is connected to the main bile duct 5 _____ the gallbladder duct. The main biliary tract 6 _____ from the liver to the duodenum, and the cystic duct is serving as entrance and exit to the gallbladder. The surface marking of the gallbladder is the intersection of the midclavicular line (MCL) and the trans pyloric

plane, at the tip of the ninth rib. The blood supply is by the cystic artery and vein, which runs 7 _____ to the cystic duct.

The gallbladder has a epithelial lining characterized by recesses called Aschoff's recesses, which are pouches inside the lining. Under epithelium there is a layer of 8 _____ tissue, followed by a muscular wall that contracts in response to cholecystokinin, a peptide hormone by the duodenum.

The gallbladder stores bile, which is released when food containing fat enters the digestive tract, 9 _____ the secretion of cholecystokinin (CCK). The bile emulsifies fats and neutralizes acids in partly digested food. After being stored in the gallbladder, the bile becomes more 10 _____ than when it left the liver, increasing its potency and intensifying its effect in fats.

1	A contains	B stores	C storing	D accumulate
2	A requires	B needs	C wants	D needed
3	A wide	B short	C far	D long
4	A detached	B connecting	C connected	D connection
5	A through	B though	C into	D over
6	A runs	B ran	C goes	D takes
7	A opposite	B parallel	C paralleled	D in front of
8	A connectively	B connecting	C connective	D connected
9	A stimulating	B stimulation	C stimulated	D stimulate
10	A concentration	B concentrated	C concentrate	D concentrative

Exercise 3. Translate into Ukrainian.

A 45-year-old patient was admitted to the surgical department with complaints of abrupt sharp pain in the epigastric region. After examination perforated ulcer of the posterior wall of the stomach was diagnosed. Where did content of the stomach flow out while perforation?

A To the omental bursa

B To the liver bursa

C To the proventriculus sack

D To the left mesenteric sinus

E To the right mesenteric sinus

Exercise 4. Translate into English.

Хірург повинен виявити загальну печінковий протоку під час оперативного втручання з приводу конкрементів у жовчних протоках. Загальна печінкова протока розташована між краями:

А Печінково - дванадцятипалокишкової зв'язки

В Печінково – шлункової зв'язки

С Печінково – ниркової зв'язки

Д Круглої зв'язки печінки

Е Венозної зв'язки

Exercise 5. Study the abbreviations and write their meaning in the table.

Abbreviation	Meaning
AAA	
CBC	
Abd	
ADL	
Cal	
Cath	
Abdms(m)(t)(o)	
AROM	
Cc	
GB	

UNIT 9

PATHOLOGIC PHYSIOLOGY OF DIGESTION

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the meaning of the words in the table.

disorder, *n*	[dɪsˈɔːdə]	
nausea, *n*	[ˈnɔːsɪə]	
vomiting, *n*	[ˈvɒmɪtɪŋ]	
bleeding, *n*	[ˈbliːdɪŋ]	
threaten, *v*	[ˈθrɛt(ə)n]	
ulcer, *n*	[ˈʌlsə]	
sore, *n*	[sɔː]	
expose, *v*	[ɪkˈspəʊz]	
destroy, *v*	[dɪˈstrɔɪ]	
erode, *v*	[|ɪˈrəʊd]	
avoid, *v*	[əˈvɔɪd]	
hole, *n*	[həʊl]	
damage, *n*	[ˈdamɪdʒ]	
blockage, *n*	[ˈblɒkɪdʒ]	
scar, *n*	[skɑː]	
twisting, *n*	[ˈtwɪstɪŋ]	
susceptible, *adj*	[səˈsɛptɪb(ə)l]	
bowel, *n*	[ˈbaʊəl]	
Helicobacter pylori, *n*	[hɛlikoʊbæktə pʌɪˈlɔːrɪ]	

Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

1. Some digestive _____ are asymptomatic.

2. Patients must _____ nonsteroidal anti-inflammatory drugs, caffeine, smoking, and alcohol.

3. Hydrochloric acid and pepsin can cause the mucous membranes of the stomach and duodenum to _____ .

4. Management includes antibiotics to _____ H. pylori and antacids to cure gastric _____ .

5. Untreated mucosal destruction produces a _____ in the wall lining.

6. Tumors, _____ tissues, intestinal _____ or the presence of foreign bodies can lead to mechanical obstructions.

7. Colorectal cancer includes changes in _____ habits, abdominal pain, anemia, weight loss, obstruction, and perforation.

8. Males are more _____ to stomach cancer.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

1. An ulcer is an open sore on mucous membranes within the body. ___

2. A leading cause of peptic ulcer disease is the bacterium Helicobacter pylori. ___

3. An intestinal obstruction is a partial blockage in the large intestine. ___

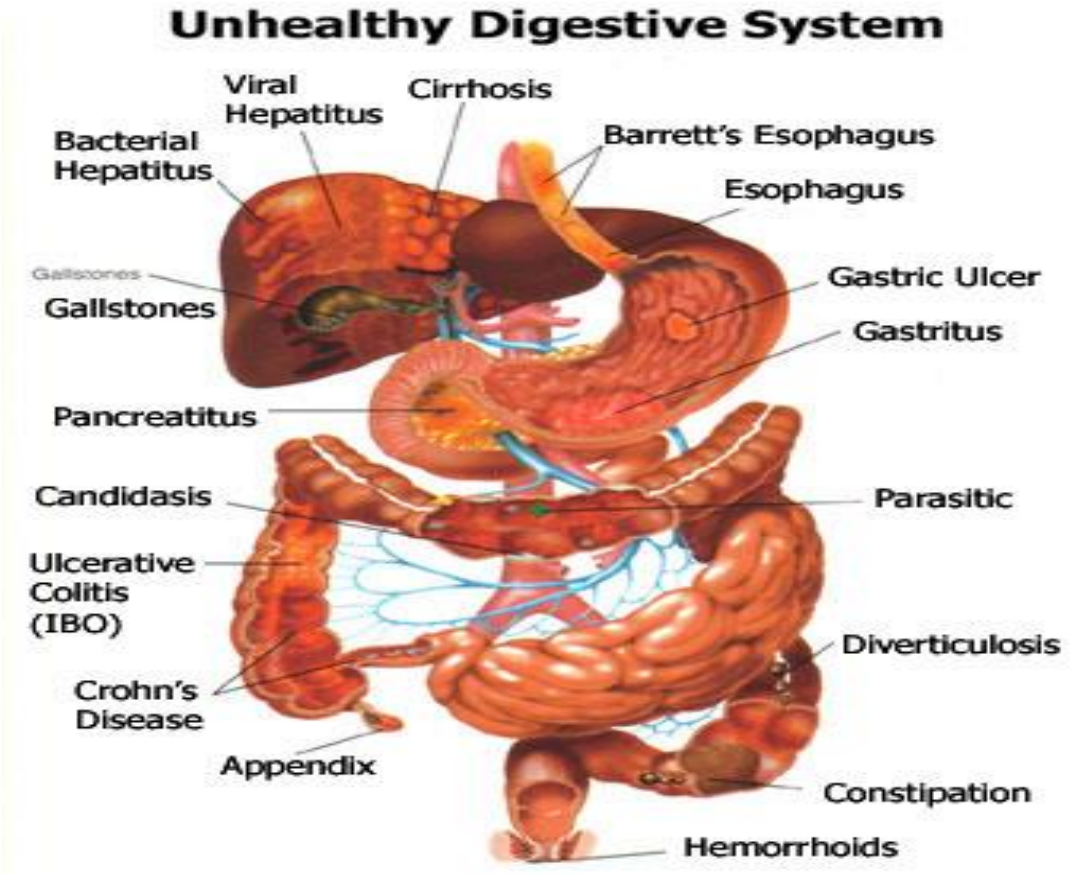
4. Peptic ulcers are the most rare type of ulcer of the digestive system. ___

5. The urgent medical treatment for an intestinal obstruction is insertion of an intestinal tube. ___

6. Complete obstruction of the intestine requires rapid diagnosis and treatment. ___

7. Stomach cancer is common in the United States. ___

8. Sigmoid cancer causes symptoms of complete obstruction. ___



https://medicalndx.com/wp-content/uploads/2015/10/digestion-related-disorders-graph.jpg

Although some digestive disorders may be without symptoms (asymptomatic), many are associated with such symptoms as nausea, vomiting, bleeding, pain, and weight loss. Disorders of the gastrointestinal (GI) tract or any of the accessory organs may result in far-reaching metabolic or systemic problems that can eventually threaten life itself. Assessment of a suspected digestive disorder includes a thorough history and physical examination. A range of diagnostic tests assists in identifying abnormalities of the GI tract, liver, gallbladder, and pancreas.

An *ulcer* is a circumscribed open sore, on the skin or mucous membranes within the body. Peptic ulcers are the most common type of ulcer that occurs in the digestive system. There are two main types of peptic ulcers: gastric ulcers, which develop in the stomach, and duodenal ulcers, which develop in the duodenum, usually in the area

nearest to the stomach. A third type of ulceration that affects the digestive system is associated with a disorder called colitis. Peptic ulcer disease (PUD) develops in the parts of the GI tract that are exposed to hydrochloric acid and pepsin. The strong action of these digestive products can destroy the protective defenses of the mucous membranes of the stomach and duodenum, causing the lining to erode. However, current studies have identified the bacterium Helicobacter pylori as a leading cause of PUD. Treatment includes antibiotics to destroy H. pylori and antacids to treat peptic ulcers. Patients are advised to avoid nonsteroidal anti-inflammatory drugs (NSAIDs), caffeine, smoking, and alcohol, which intensify (exacerbate) the symptoms of gastric ulcers. If left untreated, mucosal destruction produces a hole (perforation) in the wall lining with resultant bleeding from the damaged area.

An intestinal obstruction is a partial or complete blockage in the small or large intestine that prevents forward flow of digestive products. Complete obstruction in any part of the intestine constitutes a medical emergency and requires rapid diagnosis and treatment within a 24-hour period to prevent death. The two forms of intestinal obstructions include mechanical blockage, also called ileus and nonmechanical blockage, also called paralytic ileus. Mechanical obstructions include tumors, scar tissues (adhesions), intestinal twisting (volvolus), strangulated hernias, or the presence of foreign bodies, such as fruit pits and gallstones. Nonmechanical blockages often result after abdominal surgeries or with spinal cord lesions where peristalsis or other neurogenic stimuli are affected. The primary medical treatment for an intestinal obstruction is insertion of an intestinal tube. If the intestinal tube is ineffective in relieving the obstruction, surgery is indicated.

Oncology. Although stomach cancer is rare in the United States, it is common in many parts of the world where food preservation is problematic. It is an important medical problem because of its high mortality rate. Men are more susceptible to stomach cancer than women. The neoplasm nearly always develops from the epithelial or mucosal lining of the stomach in the form of a cancerous glandular tumor (gastric adenocarcinoma). Persistent indigestion is one of the important warning signs of stomach cancer. Other types of GI carcinomas include esophageal carcinomas,

hepatocellular carcinomas, and pancreatic carcinomas. Colorectal cancer arises from the epithelial lining of the large intestine. Signs and symptoms include changes in bowel habits, passage of blood and mucus in stools, rectal or abdominal pain, anemia, weight loss, obstruction, and perforation. An obstruction that develops suddenly may be the first symptom of cancer involving the colon between the cecum and the sigmoid. In this region, where bowel contents are liquid, a slowly developing obstruction will not become evident until the lumen is almost closed. Cancer of the sigmoid and rectum causes symptoms of partial obstruction with constipation alternating with diarrhea, lower abdominal cramping pain, and distention.

Exercise 4. Focus on grammar: Continuous Active – positive and negative.

Present Continuous is used to describe actions happening now at the moment of speaking; for temporary situations; for currently changing and developing situations.

Past Continuous is used to describe an action in progress at a specific point of time in the past; to describe temporary actions or situations.

Future Continuous is used to describe actions which will be in progress at a specific time in the future; to emphasize the duration of an action. However, this tense must always be used with a time reference.

***NOTE**: We don't generally use Continuous with verbs of perception such as* think, know, sound or look.

Look at these sentences and complete the rules with *Present Participle (-ing* form*), not, are, will, was, be, is, were, am.*

At the examination the patient was suffering from chronic sore throat and hoarseness resulting from the persistent reflux.

I am not taking painkillers at the moment.

A man isn't eating dry food now.

The doctor won't be making her morning rounds at 10.30.

- To make *positive sentences in* Present Continuous Active *we use subject + am,* ___ or ___ + *Present Participle (-ing* form*)*

- To make *positive sentences in* Past Continuous Active *we use subject + was,* or ___ *+ Present Participle (-ing* form*)*
- To make *positive sentences in* Future Continuous Active *we use subject + will be + Present Participle (-ing* form*)*
- To make *negative sentences in* Present Continuous Active *we use subject + am,* ___ or ___ *+ Present Participle (-ing* form*)*
- To make *negative sentences in* Past Continuous Active *we use subject + was,* or ___ *+ Present Participle (-ing* form*)*
- To make *negative sentences in* Future Continuous Active *we use subject + will* ___ *be + Present Participle (-ing* form*)*

Exercise 5. Fill in the gaps with the correct form of the verb in brackets using Past Simple Active, Past Simple Passive or Past Continuous Active.

A 73-year-old male with alcoholic cirrhosis 1 _____ (present) to the emergency department. The patient's state 2 _____ (complicate) by prior spontaneous bacterial peritonitis on ciprofloxacin prophylaxis. The patient 3 _____ (suffer from) fever, abdominal pain, and nausea at that moment. On admission during physical examination he 4 _____ (have) normal vital signs. His abdomen was distended and diffusely tender with a positive fluid wave. Laboratory results 5 _____ (reveal) a leukocytosis, stable liver function tests, and a creatinine of 1.8 mg/dL. Paracentesis revealed hazy peritoneal fluid with 2,590 white blood cells. He 6 _____ (start) on vancomycin and ertapenem for sepsis secondary to spontaneous bacterial peritonitis but progressively worsened clinically. On day 4 of hospitalization, the patient became tachycardic and hypotensive. A CT scan of the abdomen 7 _____ (not show) evidence of focal infection or gastrointestinal perforation. Peritoneal fluid cultures revealed *Lactobacillus paracasei*. The isolate was resistant to carbapenems and sensitive to clindamycin and penicillin. The patient 8 _____ (switch) to clindamycin and high-dose intravenous penicillin for *Lactobacillus* coverage. Despite a rapid improvement, the patient's creatinine 9 _____ (continue) to rise rapidly. He ultimately 10 _____

(develop) type 2 hepatorenal syndrome with anuric renal failure. He 11 _____ (transfer) to comfort care and 12 _____ (die) of multiorgan failure.

Exercise 6. Fill in the table. Check the meaning of new words in a dictionary.

verb	noun	adjective
		tender
resist		
present		
	improvement	
	perforation	
	hospitalization	
develop		
complicate		
		progressive
	failure	
		repeat

Exercise 7. Use the word given in capitals at the end of each line to form a word that fits in the gap in the same line.

1. If you have appendicitis, you'll likely be _____ and referred to a surgeon to remove your appendix. HOSPITALIZATION
2. A _____ ulcer is one that creates a hole through the entire thickness of an organ. PERFORATION
3. The antibiotics used will be determined by where you live and current antibiotic _____ rates. RESIST
4. Smoking may interfere with the protective lining of the stomach, making your stomach more susceptible to the _____ of an ulcer. DEVELOP
5. If left untreated, cholecystitis can lead to serious, sometimes life-threatening _____, such as a gallbladder rupture. COMPLICATE

6. The goals of cirrhosis treatment are to slow the _____ of scar tissue in the liver and to prevent or treat symptoms and complications of cirrhosis. PROGRESSIVE

7. A combination of increased screening, lifestyle changes and new medications may _____ outcomes for people with liver damage. IMPROVEMENT

8. Your doctor may recommend tests to determine the _____ of bacterium H. in your body. PRESENT

Exercise 8. **Focus on grammar: Continuous Active – questions.**

Look at these questions and complete the rule.

What are you suffering from?

When was the surgeon talking to a medical student yesterday?

When will the surgeon be performing the gastroscopy tomorrow morning?

- We make Present Continuous Active questions with*:*
  question word +am, ___ or ___ + subject + Present Participle (-ing form*).*
- We make Past Continuous Active questions with*:*
  question word + was or ___ + subject + Present Participle (-ing form*).*
- We make Future Continuous Active questions with*:*
  question word + will + subject + be + Present Participle (-ing form*).*

Exercise 9. Make questions with these words. Use Present and Past Continuous Active. Ask and answer the questions in pairs.

1. What/ on admission/ the patients with a peptic ulcer /suffer from/ pain?
2. What/ take / at the moment/ he?
3. How/ do/ you?
4. What/ hope/ we can do for you/ you?
5. What/ cause/ the disease?
6. How/ feel/ after taken this medication/ she?
7. Why/ take painkillers/ this patient?
8. How/ you/sleep/the medicine/after taking/?

Exercise 10. Medical vocabulary: combining forms.

Study the meaning of combining forms:

Combining form	**- itis**	**- osis**	**- rrhea**	**- ectomy**	**- tripsy**	**- graphy**
Meaning	inflammation	chronic disease	discharge, flow	removal, dissection	crushing	X-ray examination

Match medical terms 1-10 to their definitions a-j.

1. appendicitis 2. cirrhosis 3. steatorrhea 4. polypectomy 5. lithotripsy
6. cholecystography 7. halitosis 8. hematemesis 9. oral leukoplakia
10. cholelithiasis

a. inflammation of the appendix, usually due to obstruction or infection –

1. appendicitis

b. vomiting of blood from bleeding in the stomach or esophagus - _____

c. offensive, or "bad," breath - _____

d. presence or formation of gallstones in the gallbladder or common bile duct – _____

e. formation of white spots or patches on the mucous membrane of the tongue, lips, or cheeks caused primarily by irritation - _____

f. procedure for crushing a stone and eliminating its fragments either surgically or using ultrasonic shock waves – _____

g. scarring and dysfunction of the liver caused by chronic liver disease – _____

h. excision of a polyp – _____

i. radiographic images taken of the gallbladder after administration of a contrast material containing iodine, usually in the form of a tablet – _____

j. passage of fat in large amounts in the feces due to failure to digest and absorb it - _____

Supplementary Tasks

Exercise1. Read the texts.

Hepatitis

Hepatitis is an inflammatory condition of the liver. The usual causes include exposure to toxic substances, especially alcohol; obstructions in the bile ducts; metabolic diseases; autoimmune diseases; and bacterial or viral infections. A growing public health concern is the increasing incidence of viral hepatitis. Even though its mortality rate is low, the disease is easily transmitted and can cause significant morbidity and prolonged loss of time from school or employment.

Although forms of hepatitis range from hepatitis A through hepatitis E, the three most common forms are: hepatitis A, also called infectious hepatitis; hepatitis B, also called serum hepatitis; and hepatitis C. The most common causes of hepatitis A are ingestion of contaminated food, water, or milk. Hepatitis B and hepatitis C are usually transmitted by routes other than the mouth (parenteral), such as from blood transfusions and sexual contact. Because of patient exposure, health-care personnel are at increased risk for contracting hepatitis B, but a vaccine that provides immunity to hepatitis B is available. There is no vaccine available for hepatitis C. Patients with hepatitis C may remain asymptomatic for years or the disease may produce only mild flulike symptoms. Treatment for hepatitis includes antiviral drugs; however, there is no cure. As the disease progresses, scarring of the liver becomes so serious that liver transplantation is the only recourse.

One of the major symptoms of many liver disorders, including hepatitis and cirrhosis, is a yellowing of the skin, mucous membranes, and sclera of the eyes (jaundice, icterus). This occurs because the liver is no longer able to remove bilirubin, a yellow compound formed when erythrocytes are destroyed. Jaundice may also result when the bile duct is blocked, causing bile to enter the bloodstream.

Ulcerative Colitis

Ulcerative colitis, a chronic inflammatory disease of the large intestine and rectum, commonly begins in the rectum or sigmoid colon and extends upward into the

entire colon. It is characterized by profuse, watery diarrhea containing varying amounts of blood, mucus, and pus. Ulcerative colitis is distinguished from other closely related bowel disorders by its characteristic inflammatory pattern. The inflammation involves only the mucosal lining of the colon, and the affected portion of the colon is uniformly involved, with no patches of healthy mucosal tissue evident. Ulcerative colitis is associated with a higher risk of colon cancer. Severe cases may require surgical creation of an opening (stoma) for bowel evacuation to a bag worn on the abdomen.

Hernia

A hernia is a protrusion of any organ, tissue, or structure through the wall of the cavity in which it is naturally contained. In general, though, the term is applied to protrusions of abdominal organs (viscera) through the abdominal wall. An inguinal hernia develops in the groin where the abdominal folds of flesh meet the thighs. In initial stages, it may be hardly noticeable and appears as a soft lump under the skin, no larger than a marble. In early stages, an inguinal hernia is usually reducible; that is, it can be pushed gently back into its normal place. With this type of hernia, pain may be minimal. As time passes, pressure of the abdomen against the weak abdominal wall may increase the size of the opening as well as the size of the hernia lump. If the blood supply to the hernia is cut off because of pressure, a strangulated hernia may develop leading to necrosis with gangrene. An umbilical hernia is a protrusion of part of the intestine at the navel. It occurs more commonly in obese women and among those who have had several pregnancies. Hernias also occur in newborn infants (congenital) or during early childhood. If the defect has not corrected itself by age 2, the deformity can be surgically corrected. Treatment consists of surgical repair of the hernia (hernioplasty) with suture of the abdominal wall (herniorrhaphy).

Although hernias most commonly occur in the abdominal region, they may develop in the diaphragm. Two forms of this type include diaphragmatic hernia, a congenital disorder, and hiatal hernia, in which the lower part of the esophagus and the top of the stomach slides through an opening (hiatus) in the diaphragm into the thorax. With hiatal hernia, stomach acid backs up into the esophagus, causing

heartburn, chest pain, and swallowing difficulty. Although many hiatal hernias are asymptomatic, if the disease continues for a prolonged period, it may cause gastro-esophageal reflux disease (GERD).

Exercise2. Fill in the table about the diseases listed below using the texts of Ex. 1. Use additional information if necessary.

Name of the disease	**Causes of the disease**	**Symptoms of the disease**	**Treatment of the disease**
Umbilical hernia			
Inguinal hernia			
Ulcerative colitis			
Hepatitis A			
Hepatitis B			
Hepatitis C			

Exercise 3. Translate into Ukrainian.

A 60-year-old patient was found to have a dysfunction of main digestive enzyme of saliva. This causes the disturbance of primary hydrolysis of:

A. Proteins

B. Cellulose

C. **Carbohydrates**

D. Lactose

E. Fats

Exercise 4. Translate into English.

57-ти річний пацієнт поступив до гастроентерологічного відділення з підозрою на синдром Золлінгера-Еллісона через швидке підвищення рівня гастрину в плазмі крові. Який розлад секреторної функції шлунку є найбільш вірогідний?

A. Гіперацидна гіпосекреція

B. Гіпоацидна гіпосекреція

C. Гіпоацидна гіперсекреція

D**. Гіперацидна гіперсекреція**

E. Ахілія

Exercise 5. Study the abbreviations and write their meaning in the table.

Abbreviation	Meaning
AS	
BM	
BS	
D&V	
DU	
GIS	
LIH	
LKS	
USS	
WNL	

UNIT 10

HORMONES. HORMONE REGULATION AND SECRETION

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the translation of the words in the table.

exert, *v*	[ɪgˈzəːt]	
respond, *v*	[rɪˈspɒnd]	
transfer, *v*	[trænsˈfəː]	
affect, *v*	[əˈfekt]	
target, *n*	[ˈtɑːgɪt]	
advantage, *n*	[ədˈvɑːntɪdʒ]	
carrier, *n*	[ˈkæriə]	
interact, *v*	[ˌɪntərˈækt]	
convert, *v*	[kənˈvɜːt]	
degrade, *v*	[dɪˈgreɪd]	
navigate, *v*	[ˈnævɪgeɪt]	
eliminate, *v*	[ɪˈlɪmɪneɪt]	
intact, *adj*	[ɪnˈtækt]	
potent, *adj*	[ˈpəʊt(ə)nt]	
rate, *n*	[reɪt]	
distribution, *n*	[dɪstrɪˈbjuːʃ(ə)n]	
release, *v*	[rɪˈliːs]	
feedback loops	[ˈfiːdbæk luːp]	
integrate, *v*	[ˈɪntɪgreɪt]	
tightly, *adv*	[ˈtaɪtli]	

Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

1. When a hormone is _____ from the cell, it travels through the bloodstream to the cell upon which it will act.
2. Hormones can _____paracrine and autocrine action.
3. Hormones are chemical mediators which _____ information to the cells of the body.
4. Hormones carry instructions to the _____ cells.
5. The _____ protein helps the hormone to reach the target cells.

6. After hormones _____with their target cells they are _____from the body.

7. Many hormones are _____ to less active molecules.

8. Hormone levels depend on the _____ of their production.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

1. Hormones are the body's chemical messengers.___

2. Hormones are amino acid derivatives.___

3. Hormone imbalances can cause serious health problems.___

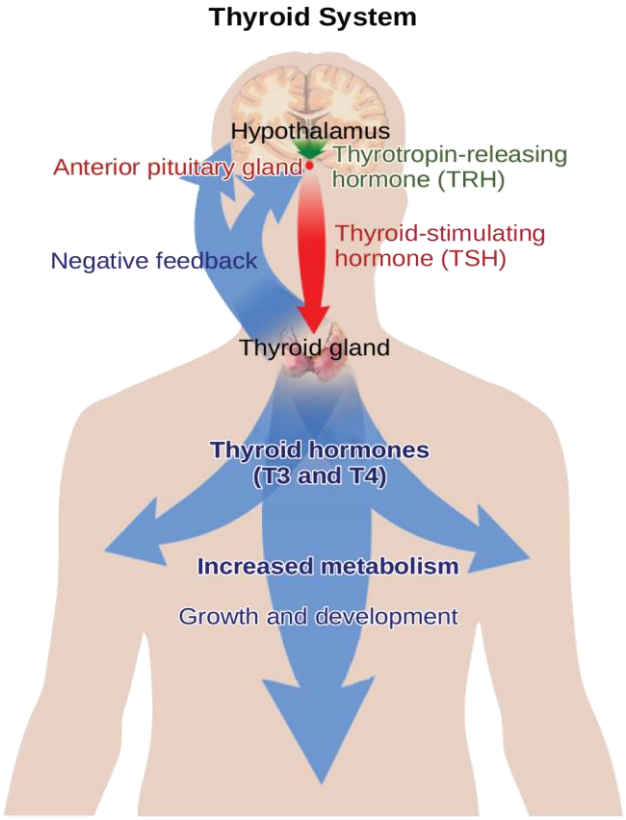
4. Hormone release is a highly organized process.___

5. Hormones circulate throughout the bloodstream bound to proteins.___

6. Hormones are never eliminated from the body.___

7. Hormones exert powerful influences throughout the body.___

8. Hormone levels in the bloodstream are always stable.___



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Hormones are the chemical signals by which the endocrine system coordinates and regulates functions such as growth, development, metabolism, and reproduction. The word “hormone” comes from the Greek word meaning “to set in motion.” Hormones are produced by various tissues and secreted into the blood or extracellular fluid. According to the traditional definition, hormones travel through the bloodstream to work on tissues in distant parts of the body. But some hormones act locally without ever entering the bloodstream. They may exert their effects on cells close to where they were produced (called paracrine action), or they may act on the same cells that produced them (autocrine action). Some hormones act upon just one type of cell; others influence many different cells. Similarly, some cells are receptive to only one hormone, while others respond to several hormones. In general hormones are either amino acid derivatives (polypeptides) or cholesterol derivatives (steroids). Depending on the target cell, the same hormone can exert biologically different effect.

As the body’s chemical messengers, hormones transfer information and instructions from one set of cells to another. Although many different hormones circulate throughout the bloodstream, each one affects only the cells that are genetically programmed to receive and respond to its message. To get to the target cells, a hormone may either circulate alone (free) or with a carrier protein in the blood. Amino acid, peptide, and protein hormones typically circulate free because they are water soluble; steroid and thyroid hormones, which are fat soluble, circulate bound to proteins. The advantage of binding is that the carrier protein helps the hormone navigate through all of the cellular traffic in the body to reach its target tissue. A bound hormone also stays longer in the blood than a free hormone, because its carrier protein holds it back from crossing a cell membrane.

After hormones interact with their target cells and produce the desired result, they are no longer needed by the body. Most hormones are either converted to less active molecules or degraded by enzymes into an inactive form before being excreted in the urine or feces. Very few hormones are eliminated intact. Peptide hormones and catecholamines are degraded by enzymes in the cell. Steroid hormones are metabolized into inactive forms and eliminated by the kidneys.

Hormones are so potent that just a tiny amount can exert powerful influences throughout the body. The effects of a particular hormone are related to its concentration in the bloodstream. Concentration is affected by the rate of production, the speed of distribution to target cells, and the speed at which the hormone is degraded after it is released from its receptor. All of these elements are strictly controlled by feedback loops or mechanisms, which measure and respond to changes within the body. Feedback loops ensure that enough hormones are produced to complete necessary tasks and keep the endocrine system tightly integrated with the nervous and immune systems. Some endocrine cells secrete their hormones at set times: every day, every month, or even every year. Other cells secrete hormones following stimulation by other hormones, or in response to internal or external stimuli. Some hormones are released in regular patterns that follow a 24-hour cycle (called circadian rhythms). Cortisol release, for example, rises in the early morning, gradually drops during the day, and stays very low during sleep. Other hormones follow a monthly, or even a seasonal, pattern. Hormone levels can also be influenced by factors such as stress, infection and changes in the balance of fluid and minerals in blood.

Exercise 4. Focus on grammar: Prepositions.

We commonly use prepositions to show a relationship in space or time or a logical relationship between people, places or things. There are over 100 prepositions in English. Some of the most common single-word prepositions are: about, above, after, against, around, at, before, behind, below, between, by, down, during, for, from, in, of, on, out, over, since, than, under, until, up, with, within.

Single-word prepositions are most commonly followed by a noun phrase or pronoun (underlined):

e.g. The hormone secreted **by** the thyroid gland is called thyroxine.

It is necessary to maintain a normal level **of** metabolism in all body cells.

Melatonin plays a key role **in** regulation of daily and seasonal circadian rhythms.

Iodine is important **for** the function of the thyroid gland.

Hormones transfer information **from** one set of cells **to** another.

The most common prepositions that consist of groups of words are: as well as, because of, due to, in addition to, in front of, in spite of, inside of, instead of, outside of, owing to, such as, thanks to, up to:

e.g. Metabolism of sugars is regulated **thanks to** insulin and glucagon.

Adrenalin **as well as** noradrenaline rise blood pressure, increase heart rate and respiration.

Endemic goiter is the enlargement of thyroid gland **due to** deficiency of iodine.

The adrenal cortex produces the groups of hormones, **such as** mineralocorticoids, glucocorticoids and sex hormones.

Exercise 5. Fill in the gaps with an appropriate preposition.

Hormones are chemicals that travel 1_____ the blood circulation and influence the functions of cells 2_____ the body. The body produces dozens 3_____ hormones 4_____ two primary chemical forms, peptides and steroids. A hormone affects only the cells that have receptors 5_____ it, and only when it binds 6_____ those receptors. A receptor is somewhat like an outlet that has a unique configuration. The hormone 7_____ which the receptor is sensitive matches that configuration, forming a chemical "lock" 8_____the hormone molecule and the cell. 9_____such binding hormones cause chemical changes 10_____ the cell that may activate enzymes or alter the cell's genetic encoding 11_____ creating new proteins (called genetic transcription). Each hormone has unique receptors. Many cells have receptors only 12_____ certain hormones, eliciting specific and narrowly focused changes. Some hormones have receptors 13_____ all cells, in such case the hormone has widespread actions. Some hormones

stimulate and others inhibit activity. Most hormonal responses occur 14_____ cascades, 15_____ multiple activities resulting 16_____ the hormone's release.

Exercise 6. Fill in the table. Check the meaning of new words in a dictionary.

verb	noun	adjective
(re)produce		(re)productive
	secretion	secretory, secreted
balance	balance, imbalance	
release		released
-	deficiency, deficit	
cell	cell	
retard		retarded
	derivative, derivation	derived

Exercise 7. Use the words given in capitals at the end of each line to form the word that fits in the gap in the same line.

1. Hormones are either amino acid _____ or cholesterol _____.	DERIVE
2. _____ metabolism, reproduction, heart rate and many other processes are regulated by the actions of hormones.	CELL
3. Hormone _____is a complicated, highly interdependent process.	PRODUCE
4. Hormone _____can result from genetic or environmental factors.	BALANCE
5. Growth hormone _____ during childhood manifests as growth _____.	DEFICIENT RETARD
6. Estrogen is a key hormone to the _____ of female _____ system.	DEVELOP REPRODUCE
7. Reduced_____ of TSH leads to hypothyroidism.	SECRETE
8. Increased production and _____ of thyroid hormone lead to the development of Graves' disease.	RELEASE

Exercise 8. **Focus on grammar: prepositions (*because of / because*)**

Because and ***because of*** are both used to introduce reasons.

Because of is a two-word preposition meaning "as a result of". We use the structure

Because of + noun

Because of + pronoun *(you, me, him, etc.)*

e.g. *The patient was administered insulin <u>because of diabetes mellitus</u>.*

Because is a conjunction. The structure we use is

Because + subject + verb

e.g. *The patient was administered insulin <u>because he had</u> diabetes mellitus.*

Complete the sentences using *because* or *because of*:

1. Hormones play a vital role in an organism _____ their influence on all systems of the body.
2. Thyroid gland is an endocrine gland _____ it secretes its hormones directly into the blood stream.
3. The pituitary gland is the "master gland" _____ its hormones control other parts of the endocrine system.
4. Parathyroid glands secrete parathyroid hormone _____ low levels of calcium in the blood.
5. Epinephrine and norepinephrine are called sympathomimetic agents _____ they mimic or copy the actions of sympathetic nervous system.
6. Mineralocorticoids are essential to life _____ they regulate the amount of mineral salts in the body.
7. The boy was administered growth hormone _____ pituitary insufficiency.
8. Overproduction of somatotropin is detrimental in childhood _____it leads to gigantism.

Exercise 9. Fill in the gaps to make the table complete.

Hormone	Target organ or tissue	Action
Parathyroid hormone (PTH)	Bones, GI tract, kidneys	

Aldosterone (mineralocorticoid)		Regulates the amount of salts in the body
Epinephrine (adrenaline)		Increases heart rate and blood pressure; dilates airways (sympathomimetic action)
Insulin	Liver	
Thyroid-stimulating hormone (TSH)	Thyroid gland	
Adrenocorticotropic hormone (ACTH)		Stimulates the secretion of hormones (glucocorticoids) from the adrenal cortex
Luteinizing hormone (LH)		Stimulates progesterone production in ovaries
Antidiuretic hormone (ADH; vasopressin)	Kidney	
Oxytocin		Stimulates contraction of the uterus during labor
Progesterone	Uterus	

Exercise 10. Medical vocabulary: combining forms. Remember the meaning of combining forms and write down the names of hormones in the table:

Combining Form	**Meaning**	**Hormone**
andr/o	male	
thyr/o	thyroid gland	
gluc/o	sugar	
somat/o	body	
gonad/o	sex glands	
lact/o	milk	
estr/o	female	
test/o	testes	

Supplementary tasks

Exercise 1. Read the text. Be ready to discuss it.

Insulin

Insulin is a peptide hormone, produced by the islands of Langerhans in the pancreas, essential for the body to use glucose. Insulin has numerous roles in the body, the best known of which is the regulation of glucose levels in the blood (carbohydrate metabolism). Glucose, a basic sugar molecule, is a primary energy source for many

cellular activities. Nearly every cell in the body has insulin receptors. When insulin binds to its receptors on the cell surface, it triggers other receptors that help the cells take in glucose. Insulin facilitates lipid (fatty acid) metabolism, stimulates the liver to convert excess glucose into the intermediary storage form glycogen, and facilitates the conversion of amino acids to proteins which is used to sustain and repair muscles. It promotes glycogen synthesis to replace glucose the muscles have used. Insulin also participates in cell activities related to growth. The beta cells of the islets of Langerhans synthesize insulin in response to elevation of glucose levels in the blood. The release of insulin allows cells to accept glucose and at the same time directs the liver to begin converting glucose to glycogen for storage. Insulin also slows the conversion of fatty acids to glycogen, a process intended to conserve the long-term energy resources of the body (fat). Insulin release may also be triggered by signals from the nervous system in response to external stimulation; for example, the sight and/or smell of food. Insulin release is inhibited not only by low glucose levels, but also by low levels of amino acids and fatty acids in the blood, as well as by the hormones somatostatin, epinephrine, and leptin. Disturbances of insulin sensitivity can allow lipids to accumulate in the blood circulation, contributing to cardiovascular diseases such as atherosclerosis and coronary artery disease (CAD). Insufficient insulin production results in diabetes, for which insulin is available as an injectable pharmaceutical as hormone therapy. Most forms of insulin available today are recombinant constructions engineered in the laboratory to precisely match the molecular structure and actions of endogenous human insulin.

Exercise 2. Choose the correct option.

1. Insulin is a

a) protein hormone b) peptide hormone c) stress hormone

2. Insulin is formed from a larger, inactive molecule, called

a) proinsulin b) enzyme c) protein

3. Insulin is synthesized by

a) liver b) thymus c) pancreas

4. Insulin is secreted primarily in response to

a) high temperature b) elevated blood concentrations of glucose c) hunger

5. The following stimuli also promote insulin secretion:

a) food b) nerve stimulation c) a and b

6. The main function of insulin is

a) regulation of body temperature b) carbohydrate metabolism c) exchange of gases

7. In the liver, insulin promotes glucose storage in the form of

a) glycogen a) glucagon c) glucose

8. Failure of insulin production leads to

a) glucose intolerance b) atherosclerosis c) diabetes mellitus

Exercise 3. Translate into Ukrainian.

Mother of an 8-year-old girl complains that the child is too short and has excessive body weight. Objectively: obesity with fat deposits on the torso and face (round moon-like face), acne, striae on the thighs and lower abdomen, hirsutism. What hormone can cause such symptoms, when in excess?

A. Cortisol

B. Thyroxin

C. Testosterone

D. Insulin

E. Glucagon

Exercise 4. Translate into English.

Хлопчик 10-ти років хворіє на цукровий діабет перший рік. Одержує інсулін (хумулін R, NPH) з розрахунку 0,4 ОД/кг ваги на добу. Інсулін вводиться під шкіру плеча шприц-ручкою. Які міри слід вжити для профілактики ліподистрофії?

A. Перейти на інший вид інсуліну

B. Міняти місце введення інсуліну

C. Обмежити жири в дієті дитини

D. Зменшити дозу інсуліну

Е. Призначити антиоксиданти

Exercise 5. Study the abbreviations of hormones and write their meaning in the table.

Abbreviation	Meaning
ACTH	
ADH	
FSH	
GH	
LH	
MSH	
NPH	
OT	
PGH	
PRL	
PTH	
STH	
T_3	
T_4	
TSH	

UNIT 11

ANATOMY AND PHYSIOLOGY OF THE ENDOCRINE SYSTEM

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the meaning of the words in the table.

Adrenal gland	[ədˈriːnl]	
deficient, *adj*	[dɪˈfɪʃənt]	
duodenum, *n*	[ˌdjuːəˈdiːnəm]	
islets, *n*	[ˈaɪlət]	
isthmus, *n*	[ˈɪsθməs]	
hypothalamus, *n*	[ˌhaɪpəʊˈθæləməs]	
oxytocin, *n*	[ˌɒksɪˈtəʊsɪn]	
pancreas, *n*	[ˈpæŋkriəs]	
pituitary gland	[pɪˈtjuːɪtərɪ]	
parathyroid gland	[ˌpærəˈθaɪrɔɪd]	
puberty, *n*	[ˈpjuːbəti]	
ovaries, *n*	[ˈəʊvəri]	
target cell	[ˈtɑːgɪt]	
thyroid gland	[ˈθaɪrɔːɪd]	
thyroxine, *n*	[ˈθaɪrɒksɪn]	

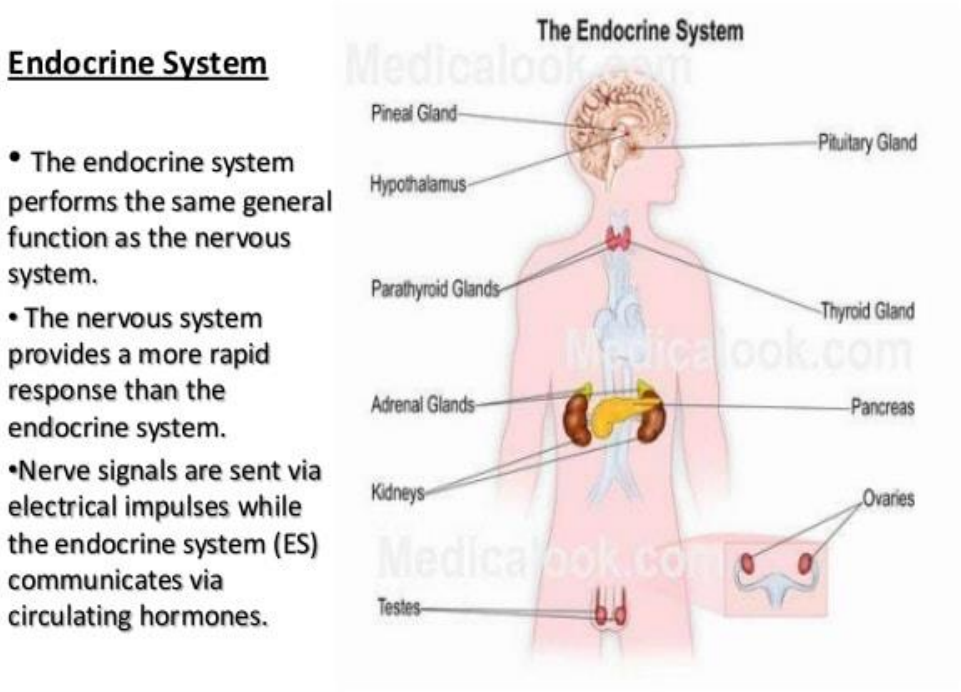
Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

1. Hormones influence their _____ by chemically binding to specific receptors.
2. Thyroid-stimulating hormone (TSH) binds to receptors on cells of the thyroid gland, but it does not bind to cells of the _____.
3. _____is a peasized organ located at the base of the brain.
4. The anterior lobe, triggered by the action of the _____, produces at least six hormones.

5. The posterior lobe stores and secretes two hormones produced by the hypothalamus: antidiuretic hormone (ADH) and _____.
6. Thyroid gland is composed of two large lobes that are separated by a strip of tissue called an _____.
7. _____ is the major hormone secreted by the thyroid.
8. The _____ consists of at least four separate glands located on the posterior surface of the lobes of the thyroid gland.
9. The _____ are paired organs covering the superior surface of the kidneys.
10. The pancreas lies inferior to the stomach in a bend of the _____.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

1. The endocrine system includes glands that secrete hormones directly into the urine rather than through a duct (exocrine glands)._____
2. Hormones influence their target cells by chemically binding to specific receptors._____
3. The pituitary gland, or hypophysis, is a peasized organ located at the base of the heart. _____
4. The pituitary gland consists of four distinct portions. _____
5. TH increases the rate of nitrogen consumption and thus the rate at which carbohydrates, proteins, and fats are metabolized._____
6. PTH helps to regulate calcium balance by stimulating three target organs: bones, kidneys, and intestines._____
7. The adrenal glands are also known as suprarenal glands._____
8. A large pancreatic duct runs through the stomach, carrying enzymes and other exocrine digestive secretions from the pancreas to the large intestine._____
9. It is believed that melatonin may inhibit the activities of the brain._____



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The endocrine system includes glands that secrete hormones directly into the bloodstream rather than through a duct (exocrine glands). Although a given hormone travels anywhere in the body that blood does, it affects only a specific target. Hormones influence their target cells by chemically binding to specific receptors. Only the target cells for a given hormone have receptors that bind and recognize that hormone. The receptors initiate specific biological effects when the hormones bind to them. For example, thyroid-stimulating hormone (TSH) binds to receptors on cells of the thyroid gland, but it does not bind to cells of the ovaries because ovarian cells do not have TSH receptors. The release of a hormone by an endocrine gland to a target is determined by the body's need for the hormone at any given time and is regulated to avoid

overproduction (hypersecretion) or underproduction (hyposecretion). Unfortunately, there are times when the body's regulating mechanism does not operate properly and hormone levels become excessive or deficient, causing various disorders.

The (1) pituitary gland, or hypophysis, is a peasized organ located at the base of the brain. It is known as the master gland because it regulates many body activities and stimulates other glands to secrete their own specific hormones. The pituitary gland consists of two distinct portions, an anterior lobe (adenohypophysis) and a posterior lobe (neurohypophysis). The anterior lobe, triggered by the action of the hypothalamus, produces at least six hormones. The posterior lobe stores and secretes two hormones produced by the hypothalamus: antidiuretic hormone (ADH) and oxytocin. These hormones are released into the bloodstream as needed.

The (2) thyroid gland is the largest gland of the endocrine system. An H-shaped organ located in the neck just below the larynx, this gland is composed of two large lobes that are separated by a strip of tissue called an isthmus. Thyroid hormone (TH) is the body's major metabolic hormone.TH increases the rate of oxygen consumption and thus the rate at which carbohydrates, proteins, and fats are metabolized. TH is actually two active iodinecontaining hormones, thyroxine (T4) and triiodothyronine (T3). Thyroxine is the major hormone secreted by the thyroid; most triiodothyronine is formed at the target tissues by conversion of T4 to T3. Except for the adult brain, spleen, testes, uterus, and the thyroid gland itself, thyroid hormone affects virtually every cell in the body. TH also influences growth hormone and plays an important role in maintaining blood pressure.

The (3) parathyroid glands consist of at least four separate glands located on the posterior surface of the lobes of the thyroid gland. The only hormone known to be secreted by the parathyroidglands is parathyroid hormone (PTH). PTH helps to regulate calcium balance by stimulating three target organs: bones, kidneys, and intestines. Because of PTH stimulation, calcium and phosphates are released from bones, increasing concentration of these substances in blood. Thus, calcium that is necessary for the proper functioning of body tissues is available in the bloodstream. At the same time, PTH enhances the absorption of calcium and phosphates from foods in the

intestine, causing a rise in blood levels of calcium and phosphates. PTH causes the kidneys to conserve blood calcium and to increase the excretion of phosphates in the urine.

The (4) adrenal glands are paired organs covering the superior surface of the kidneys. Because of their location, the adrenal glands are also known as suprarenal glands. Each adrenal gland is divided into two sections, each of which has its own structure and function. The outer adrenal cortex makes up the bulk of the gland and the adrenal medulla makes up the inner portion. Although these regions are not sharply divided, they represent distinct glands that secrete different hormones.

The (5) pancreas lies inferior to the stomach in a bend of the duodenum. It functions as an exocrine and endocrine gland. A large pancreatic duct runs through the gland, carrying enzymes and other exocrine digestive secretions from the pancreas to the small intestine. The endocrine portion of the pancreas consists of groups of cells called islets of Langerhans. The islets secrete two distinct types of hormones: alpha cells that produce glucagon and beta cells that produce insulin. Both hormones play important roles in carbohydrate metabolism. When blood glucose levels are low (hypoglycemia), stimulates the release of glucose from storage sites in the liver. Because the liver converts stored glycogen to glucose (glycogenolysis), the blood glucose level rises. The overall effect, therefore, is a rise in the blood glucose level. When blood glucose levels are high (hyperglycemia), the pancreatic beta cells are stimulated to produce insulin. This insulin production causes glucose to enter body cells to be used for energy and acts to clear glucose from the blood by promoting its storage as glycogen. Insulin and glucagon function antagonistically so that normal secretion of both hormones ensures a blood glucose level that fluctuates within normal limits.

The (6) pineal gland, which is shaped like a pine cone, is attached to the posterior part of the third ventricle of the brain. Although the exact functions of this gland have not been established, there is evidence that it secretes the hormone melatonin. It is believed that melatonin may inhibit the activities of the ovaries. When melatonin production is high, ovulation is blocked, and there may be a delay in puberty.

Exercise 4. Focus on grammar: modal verbs.

Use **can** to talk about ability

The primary function of the endocrine system is to keep the body in homeostasis, the body's internal state of equilibrium that is maintained so all body systems **can** function most effectively.

Can does not change. It is the same with all subjects.

Can is followed by a second verb. The second verb is **the infinitive without to.**

Dogs can hear much better than human.

Use **will be able to** for the future. The negative form of the future is **will not be able to or won't be able to.**

A robot will / won't be able to replace a nurse.

Will a robot ever be able to replace a nurse?

Example	Explanation
The patient has a mild fever and a cough It **could / might/ may** be a viral infection.	Could, may and might can be used to say that a situation is possible. In this example there are other possible diagnoses.
With these levels of glucose, it **must** be diabetes.	Must can be used when we have a high level of certainty about a particular situation. In this case, the level of glucose indicates that other possibilities have been eliminated. We can be fairly certain that the patient has diabetes.
Tests came back negative. It **can't** be pancreatitis	The opposite of must for expressing a high degree of certainty about smth is **can't.** In this case, the tests done to

	check the diagnosis of pancreatitis were negative. We can be fairly sure the patient doesn't have the disease.
There is no known family history**. It's unlikely** to be hereditary. **It's likely** that she picked it up at university. A lot of her mates are ill.	We can also use **it is likely/ unlikely** to express strong possibility

Exercise 5. Fill in the gaps with the appropriate modal verbs: must, mustn't, can, can't, may, don't have to. Then say what they express in each sentence.

1. We _____study medicine.
2. A surgeon _____ start performing the operation immediately.
3. You _____ enter the operating room without a sterile overall, a mask and the overshoes.
4. Nurses _____ wear gloves all the time.
5. Visitors _____smoke in the hospital.
6. Anesthesia _____ be accomplished without the loss of consciousness, or with partial or total loss of consciousness.
7. _____ we be present during the operation?
8. The test came back negative. It_____ be pancreatitis.
9. We _____buy these medicines. Our department has received them in adequate amount.

6. Fill in the table. Check the meaning of new words in dictionary.

Noun	**Verb**	**adjective**
achievement	achieve	
release		releasable
	bound	binding
location	locate	

storage		stored
	stimulate	stimulating
attachment	attach	
division		dividing
	care	caring

Exercise 7. Use the word given in capitals at the end of each line to form a word that fits in the gap in the same line.

1.Only the target cells for a given hormone have receptors that _____ and recognize that hormone.	BINDING
2.The _____ of a hormone by an endocrine gland to a target is determined by the body's need for the hormone at any given time.	RELEASE
3.Hypophysis is a peasized organ _____ at the base of the brain.	LOCATION
4.It is known as the master gland because it _____ many body activities and stimulates other glands to secrete their own specific hormones.	REGULATION
4.The posterior lobe _____ and secretes two hormones produced by the hypothalamus: antidiuretic hormone (ADH) and oxytocin.	STORAGE
5. PTH helps to regulate calcium balance by _____three target organs: bones, kidneys, and intestines.	STIMULATE
6.Each adrenal gland is _____ into two sections, each of which has its own structure and function.	DIVISION
7. A large pancreatic duct runs through the gland, _____ enzymes and other exocrine digestive secretions from the pancreas to the small intestine.	CARRY
8. The pineal gland, which is shaped like a pine cone, is _____ to the posterior part of the third ventricle of the brain.	ATTACH

Exercise 8. Focus on grammar: The infinitive

The infinitive of a verb is its basic form with or without the particle *to*:

The infinitive without to is called ***bare infinitive*** ('***do***', '***be***')

The infinitive with to is called ***full infinitive*** ('***to do***', ***'to be***')

The bare infinitive

The bare infinitive is used as the main verb after the dummy auxiliary verb *do*, or most modal auxiliary verbs (such as *will, may, must can.)*

Exercise 9. Translate the following sentences into Ukrainian. Choose the most suitable way of translation or give two versions of translation if possible.

1. To demonstrate the value of preventive method it is important to select areas for action where the beneficial effects appear fairly soon and to initiate systemic research and experiments over a longer periods.
2. To attain the goal of physical activity for all we have to increase opportunities and willingness of public to participate in health-enhancing physical activity.
3. A turbid exudate to be cleansed from the abdominal cavity was the result of peritonitis.
4. All the data of the patient's family history to be analysed by the doctor will help him to administer a proper treatment.
5. The famous surgeon Pirogov was the first to operate on the intestines in cases of bullet wounds.
6. The findings of experiment to be applied in practice had been properly checked.
7. The therapeutist prescribed to me the medicine to be taken a table –spoonful three times a day.
8. The students watched the surgeon make a midline abdominal incision with a scalpel.
9. The doctor made the patient stay in bed.
10. I watch her enter the hospital.

Exercise 10. Medical vocabulary: combining forms. Study the meaning.

Combining form	adren/o	home/o	eu	exo	hypo	hyper
Meaning	Adrenal gland	same	good	outside	under	excessive

Match medical terms to their definitions.

1bind 2 hypoglycemia 3 lobe 4 mean 5 edema 6 flared 7 hypoxemia 8 erupted

a) low blood _____
b) sugar stick together_____
c) average_____
d) rounded projection of the body organ or part_____
e) dilated, open_____
f) swelling caused by excessive lymph fluid in the tissues_____
g) visible_____
h) abnormally low oxygen in the blood_____

Supplementary tasks

1.<u>Answer the questions.</u>

1) After consuming a banana split, which hormones would be expected to increase?

Choose 1 answer:

a) Prolactin
b) Glucagon
c) Insulin
d) Parathyroid Hormone

2) After having a double-bacon cheeseburger with a milkshake, which of the following hormones would NOT be expected to increase?

a) Secretin
b) Insulin

c) Cholecystokinin
d) Glucagon

3) Which of the following hormones would bind to receptors located on the inside of a cell?
   a) Testosterone
   b) Follicle-Stimulating
   c) Hormone Prolactin
   d) Growth Hormone
4) Which of the following accurately describes thyroid hormone?
   a) Released from the anterior pituitary
   b) Binds to receptors on the outside of the cell
   c) Derived from cholesterol
   d) Binds to receptors on the inside of the cell
5) Hormones travel through the blood stream and bind to receptors located on target cells. Which of the following would NOT bind to transmembrane proteins on the target cells?
   a) Estrogen
   b) Prolactin
   c) Insulin
   d) Antidiuretic Hormone
6) Which of the following hormones would be expected to increase if you were studying all day for a test and skipped breakfast and lunch?
   a) Glucagon
   b) Growth
   c) Insulin
   d) Calcitonin

2. Do the test Anatomy & Physiology of the Endocrine System / Practice Exam https://study.com/academy/exam/topic/anatomy-physiology-of-the-endocrine-system.html

3. Read the text and fill in the gaps with the words in the box.

glands, a target, reproduction, growth, hormone, complicated systems, pineal glands, thyroid, activities.

The primary function of the endocrine system is to keep the body in homeostasis, the body's internal state of equilibrium that is maintained so all body systems can function most effectively. Thus, the endocrine system comprises a network of ductless_____ which have a rich blood supply that enables the hormones they produce to enter the bloodstream and influence body functions. Hormones are chemicals produced by glands that cause a specific effect at_____. A target, also known as a target cell, is programmed with receptors to respond to a unique hormone. Although hormones travel throughout the entire body in blood and lymph, they affect only targets that have specific receptors for the _____. Once bound to the receptor, the hormone initiates a specific biological effect. Hormones control diverse activities such as_____, metabolism, _____, energy level, and sexual characteristics. Although the nervous system provides many of the same functions as the endocrine system, it is designed to act instantaneously by transmitting electrical impulses to specific body locations. It is one of the most _____ of the body. Nonetheless, the endocrine and nervous systems work together like an interlocking super system to control many intricate _____ of the body. This chapter discusses the structure and functions of hormones and the pituitary, _____, parathyroid, adrenal, pancreatic, and _____ glands.

UNIT 12.

ENDOCRINE DISORDERS

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the meaning of the words in the table.

hyposecretion, *n*	[ˌhʌɪpəʊsɪˈkriːʃ(ə)n]	
hypersecretion, *n*	[ˌhʌɪpəsɪˈkriːʃ(ə)n]	
hormone replacement	[ˈhɔːməʊn rɪˈpleɪsm(ə)nt]	
hormone deficiency	[ˈhɔːməʊn dɪˈfɪʃ(ə)nsi]	
electrolyte imbalance	[ɪˈlɛktrəlʌɪt ɪmˈbal(ə)ns]	
cretinism, *n*	[ˈkretɪnɪzm]	
edema, *n*	[ɪˈdiːmə]	
weight gain	[weɪt 'geɪn]	
cold intolerance	[kəʊld ɪnˈtɒl(ə)r(ə)ns]	
fatigue, *n*	[fəˈtiːg]	
joint pain	[dʒɔɪnt 'peɪn]	
weight loss	[weɪt 'lɒs]	
perspiration, *n*	[pəːspɪˈreɪʃ(ə)n]	
muscle weakness	[ˈmʌs(ə)l ˈwiːknəs]	
goiter, *n*	['gɔɪtə]	
administration, *n*	[ədmɪnɪˈstreɪʃ(ə)n]	
diabetes	[dʌɪəˈbiːtiːz 'melitis]	
obesity, *n*	[ə(ʊ)ˈbiːsɪti]	

Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

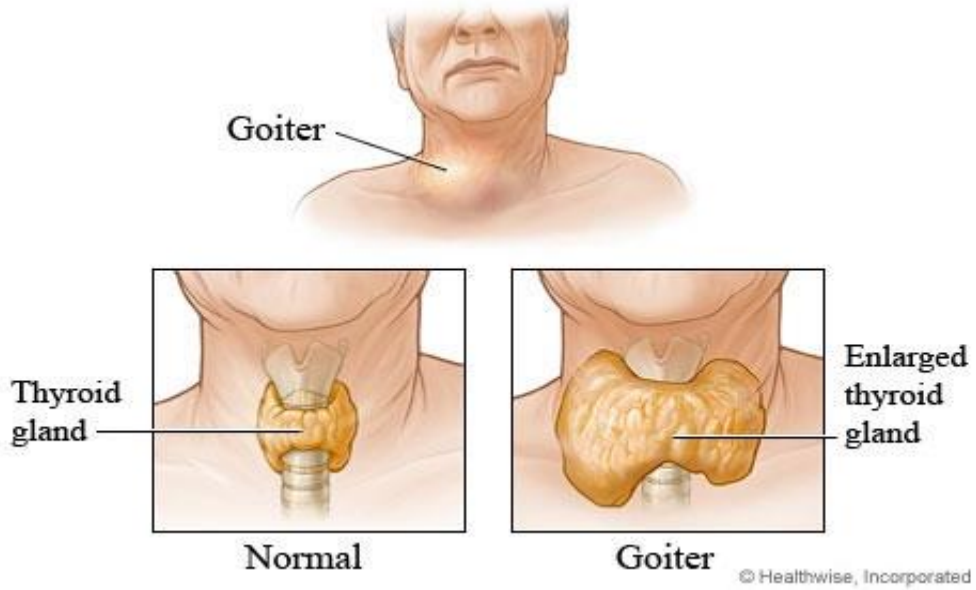
1. Until recently, the common type of _____ in children and teens was type 1.
2. Growth _____ _____ means the pituitary gland does not make enough growth hormone.
3. Toxic nodular _____ starts from an existing simple _____.
4. Patient may not need _____ _____ if only part of thyroid was removed.
5. Lack of sleep, which in turn leads to _____, may affect your self-esteem, mood, and emotions.
6. _____ _____ is a common side effect for people who take insulin.

7. Hypothyroidism has many symptoms that can vary from person to person and one of the most common symptoms is _____ _____.

8. Childhood _____ is a serious problem putting children and adolescents at risk of poor health.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

1. Hyposecretion is treated with drug therapy.
2. Hypersecretion is usually treated with radiotherapy.
3. Thyroid gland disorders may develop only in children.
4. In Graves disease the eyes are likely to protrude.
5. The parathyroid gland is associated with Addison disease.
6. Cushing syndrome alters carbohydrate and protein metabolism.
7. Diabetes, when used alone, refers to diabetes mellitus.
8. Diabetes mellitus occurs in one primary form.



https://sites.google.com/a/newtech.coppellisd.com/endocrine-diseases/_/rsrc/1468888671827/home/h9991416_001.jpg

Disorders of the endocrine system are caused by underproduction (hyposecretion) or overproduction (hypersecretion) of hormones. In general, hyposecretion is treated with drug therapy in the form of hormone replacement. Hypersecretion is generally treated by surgery. Most hormone deficiencies result from genetic defects in the glands, surgical removal of the glands, or production of poor-quality hormones.

Pituitary disorders are related to hypersecretion or hyposecretion of growth hormone, which leads to body-size abnormalities.

Thyroid gland disorders are common and may develop at any time during life. They may be the result of a developmental problem, injury, disease, or dietary deficiency. One form of hypothyroidism that develops in infants is called ***cretinism.*** If not treated, this disorder leads to mental retardation, impaired growth, and abnormal bone formation. When hypothyroidism develops during adulthood, it is known as ***myxedema*** which is caracterized by edema, low blood levels of T_3 and T_4, weight gain, cold intolerance, fatigue, depression, muscle or joint pain.

Hyperthyroidism results from excessive secretions of T_3, T_4, or both. Two of the most common disorders of hyperthyroidism are Graves disease and toxic goiter. **Graves disease** is considerably more prevalent and is characterized by an elevated metabolic rate, abnormal weight loss, excessive perspiration, muscle weakness, and emotional instability. Also, the eyes are likely to protrude (**exophthalmos**) because of edematous swelling in the tissues behind them. T**oxic goite**r may occur because of excessive release of thyroid-stimulating hormone (TSH) from the anterior lobe of the pituitary gland.

Parathyroid disorders. As with the thyroid gland, the dysfunction of the parathyroids is usually characterized by inadequate or excessive hormone secretion.

Insufficient production of parathyroid hormone (PTH), called ***hypoparathyroidism,*** can be caused by primary parathyroid dysfunction or elevated blood calcium levels. The primary effect of hypoparathyroidism is a decreased blood calcium level (**hypocalcemia**).

Excessive production of PTH, called ***hyperparathyroidism,*** is commonly caused by a benign tumor that must be removed.

Disorders of adrenal glands. The adrenal cortex is mainly associated with Addison disease and Cushing syndrome. **Addison disease** results when the adrenal cortex is damaged or atrophied. Clinical manifestations include anxiety, muscle weakness, anorexia, gastrointestinal symptoms, fatigue, hypoglycemia, hypotension, low blood sodium (**hyponatremia**), and high serum potassium (**hyperkalemia**). If treatment for this condition begins early, usually with adrenocortical hormone therapy, the prognosis is excellent.

Cushing syndrome is a group of symptoms produced by excessive amounts of cortisol, adrenocorticotropic hormone (ACTH), or both circulating in the blood. Its causes include long-term administration of steroid drugs, adrenal tumor and Cushing disease. Cushing syndrome alters carbohydrate and protein metabolism and electrolyte balance. Its may cause weight gain and structural changes, such as a moon-shaped face, grossly exaggerated head and trunk, and pencil-thin arms and legs. Other symptoms include fatigue, high blood pressure, and excessive hair growth in unusual places (**hirsutism**). The treatment goal for this disease is to restore serum cortisol to normal levels.

Pancreatic disorders. ***Diabetes*** is a general term that, when used alone, refers to diabetes mellitus (DM). It is a chronic metabolic disorder of impaired carbohydrate, protein, and fat metabolism due to insufficient production of insulin or the body's inability to utilize insulin properly. DM occurs in two primary forms (***Type 1 diabetes*** and ***Type 2 diabetes***). Although genetics and environmental factors, such as obesity and lack of exercise, seem significant in the development of this disease, the cause of diabetes is not always clear. Diabetes is associated with a number of primary and secondary complications.

Exercise 4. Focus on grammar: Gerund.

A gerund is a verb in its ing (present participle) form that functions as a noun that names an activity rather than a person or thing. Any action verb can be made into a gerund.

Gerund examples

Gerunds can appear at the beginning of a sentence when used as a subject:

1. **Walking** a few miles a day will keep your body healthy.

Gerunds can act as an object following the verb:

1. The patient quitted **smoking** a year ago.

Gerunds can serve as an object after a preposition:

1. The scientist works on **introducing** this medical drug to the clinical setting.

Note: The same spelling rules that apply to the progressive tenses also apply to gerunds.

Some verbs and verb phrases are directly followed by a gerund:

1. You should avoid **using** chemicals on the vegetables you grow.

Some verbs can be followed by a gerund or an infinitive without causing a change in meaning:

1 Some people prefer **getting up** early in the morning.

2 Some people prefer **to get up** early in the morning.

Some verbs can be followed by a gerund or infinitive but with a change in meaning:

1 He remembered **sending** the mail. (He remembered the act of send the mail)

2 He remembered **to send** the mail. (He remembered the mail and sent it.)

Exercise 5. Match two parts of the sentences.

1. Endocrine glands have primary function of	a) controlling body functions.
2. Thyroid gland disorders may be the result of	b) coordinating the activities of organ systems.
3. Hormones perform their function by	c) producing hormones for human body.
4. Endocrine system associates the nervous system in	d) damaging the organ.
5. One of the major tasks of hormones is	e) attaching to the target cells and then comminicating with them.

6. Thyroid hormone plays an important role in	f) releasing its hormones.
7. Neurohormones signal pituitary gland to release or stop	g) promoting glucose usage and storage.
8. Insulin lowers blood glucose levels by	h) maintaining blood pressure.

Exercise 6. Fill in the table. Check the meaning of new words in a dictionary.

verb	noun	adjective
	duct	
		resistant
	complication	
exceed		
___		essential
	treatment	
investigate		
		productive

Exercise 7. Use the word given in capitals at the end of each sentence to form a word that fits in the gap.

1.Growth hormone stimulates growth and cell _____ in the body. PRODUCE

2.Hyperthyroidism requires _____ with medication to slow the thyroid gland. TREAT

3. The adrenal gland can develop nodules or masses which require _____. INVESTIGATE

4. Insulin _____ is a very common characteristic of type 2 diabetes in patients who are obese. RESIST

5. Iodine is an _____ nutrient that is required for the production of thyroid gland. ESSENCE

6. Pancreatitis is most commonly caused by _____ intake of alcohol, trauma and obstruction. EXCESS

7. Type 2 diabetes is a serious metabolic disease that is associated with vascular _____. COMPLICATE

8. Endocrine glands do not have ducts and hence they are called as _____ glands. DUCT

Exercise 8. Fill in the gaps with gerund of the verb in brackets.

1. In type 2 diabetes, the body is deficient in _____ (produce) sufficient insulin.
2. _____ (treat) such diseases as rheumatoid arthritis and asthma with steroid drugs can cause Cushing syndrome.
3. Hormones direct the nervous system by _____ (stimulate) or _____ (inhibit) the release of neural impulses.
4. During periods of fasting, cortisol maintains blood glucose levels by _____ (affect) a number of metabolic processes.
5. Women with gestational diabetes are at an increased chance of _____ (develop) type 2 diabetes over the next 5-10 years.
6. The risk of the complications of diabetes can be lowered by _____ (control) blood glucose and blood pressure.
7. Cholecystokinin may help regulate food intake by _____ (signal) the feeling of satiety.
8. The pancreas is very important organ because it helps _____ (maintain) our blood sugar levels.

Exercise 9. In each set of words one is the odd one out: different from the others. Find the word that is different, and underline it.

1.	hypothalamus	thyroid	brain	thymus
2.	myxedema	stroke	goiter	diabetes
3.	surgery	drug therapy	vascular disease	radiation therapy

4.	elevated cholesterol	inactivity	family history of endocrine disorder	auscultation
5.	steroid drugs	TRH test	iodine uptake scan	thyroid scan
6.	growth hormone	lymph	oxytocin	antidiuretic hormone
7.	fatigue	weight loss	weakness	thyroiditis

Exercise 10. Medical vocabulary: combining forms.

Study the meaning of combining forms meaning glands.

Combining form	adeno-	adrenalo-	gonado-	pancreato-	parathyroido-	pituitaro-	thyro-, thyroido-
Meaning	gland	adrenal gland	sex glands	pancreas	parathyroid gland	pituitary gland	thyroid gland

Match medical terms 1-8 to their definitions a-h.

1 adrenalectomy	2 adenoma	3 hypogonadism	4 pancreatectomy
5 hyperparathyroidism	6 thyroiditis	7 pituitary neoplasm	8 thyroxine

a a benign epithelial tumor with a glandular organization - _____

b excision of one or two adrenal glands - _____

c the major hormone derived from the thyroid gland - _____

d inflammation of the thyroid gland - _____

e a condition resulting from deficient gonadal functions - _____

f a condition of abnormally elevated output of parathormone - _____

g surgical removal of the pancreas - _____

h neoplasm which arises from or metastasizes to pituitary gland - _____

Supplementary Tasks

Exercise 1. Read the text.

Goiter

Goitre is enlargement of the thyroid gland resulting in a prominent swelling in the front of the neck. The normal human thyroid gland weighs 10 to 20 grams, and some goitrous

thyroid glands weigh as much as 1,000 grams. The entire thyroid gland may be enlarged, or there may be one or more large thyroid nodules. The function of the thyroid gland may be decreased, normal, or increased. A very large goitre may cause sensations of choking and can cause difficulty in breathing and swallowing.

The most common type of goitre is endemic goitre, caused by iodine deficiency. Iodine is an essential nutrient that is required for the production of thyroid hormone. When iodine intake is low, thyroid hormone production is low, and in response the pituitary gland secretes greater quantities of the hormone thyrotropin (thyroid-stimulating hormone, TSH) in an attempt to restore thyroid hormone production to normal. This excess thyrotropin stimulates not only thyroid hormone production but also thyroid growth. Endemic goitre is more common among girls than boys and among women than men. It occurs most frequently in inland or mountainous regions where the natural iodine content of the water and soil is very low. It can be easily prevented by use of salt or food to which iodine has been added. In young people, increasing iodine intake results in regression of the goitre; however, the likelihood of regression diminishes with age. Surgical removal of the thyroid gland may be necessary if the goitre causes breathing or swallowing problems.

There are numerous other causes and types of goitre. One is caused by a defect in one of the steps in the synthesis of thyroid hormone. Like iodine deficiency, these defects result in increased thyrotropin secretion. More-common causes are one or multiple nodules in the thyroid (uninodular or multinodular goitre), infiltration of the thyroid by lymphocytes or other inflammatory cells (thyroiditis) or stimulation of thyroid growth (and function) by antibodies that activate the thyroid in the same way as does thyrotropin, as occurs in the disorder called Graves disease.

Exercise 2. Choose the correct option.

1. Goiter is

a) inflammation of the thyroid gland

b) enlargement of the of the thyroid gland

c) diminution of the thyroid gland

2. The function of the thyroid gland may be

a) decreased or normal

b) decreased or in creased

c) decreased, normal, or increased

3. The most common type of goiter is

a) endemic goiter

b) simple goiter

c) disseminated goiter

4. Essential nutrient required for the production of thyroid hormone is

a) copper

b) magnesium

c) iodine

5. Endemic goiter is

a) equal between men and women

b) more common among women that men

c) more common among men that women

6. Endemic goiter occurs

a) equally in all regions

b) most frequently in inland or mountainous regions

c) most frequently in sea regions

7. Increasing iodine intake results in regression of the goiter successfully

a) in people of any age

b) in old people

c) in young people

8. The most common cause of goiter is

a) iodine deficiency

b) nodules in the thyroid

c) infiltration of the thyroid

Exercise 3. Translate into Ukrainian.

Bessie's facial features gradually became "rough" in her late thirties and forties. By the time she was 50, her children noticed her very large hands and recommended that she see an endocrinologist. What disease was she diagnosed?

a) Hyperinsulism

b) Hypothyroidism

c) Acromegaly

d) Cushing syndrome

e) Graves disease

Exercise 4. Translate into English.

Мері помітила, що вона останнім часом набрала вагу і що її обличчя має місяцеподібну повноту. Аналізи крові і сечі показали надмірне вироблення наднирникових глюкокортикоїдів. Її діагностичне дослідження виявило збільшення обох наднирникових залоз. Яку хворобу у неї діагностували?

а) Хвороба Грейвза

б) Синдром Кушінга

в) Аддісонова хвороба

г) Діабет

д) Гіпертиреоз

Exercise 5. Study the abbreviations of endocrine disorders, tests, and procedures and write their meaning in the table.

Abbreviation	Meaning
DI	
DKA	
DM	
FBG	
FBS	

GTT	
MDI	
RAI	
RIA	
RAIU	
TFT	

UNIT 13

ANATOMY AND PHYSIOLOGY OF THE INTEGUMENTARY SYSTEM

Exercise 1. Which of these words and word-combinations do you know? Check new words and word-combinations in a dictionary. Write the translation of them in the table.

basal layer	[ˈbeɪs(ə)l ˈleɪə]	
dermis, *n*	['də:mɪs]	
epidermis, *n*	[ˌepɪˈdə:mɪs]	
hair follicle	['heə ˈfɒlɪk(ə)l]	
hair shaft	['heə ˈʃa:ft]	
homeostasis, *n*	[ˌhɒmɪə(ʊ)ˈsteɪsɪs]	
integumentary system	[ɪnˌtegjʊˈmentərɪ ˈsɪstəm]	
melanin, *n*	['mɛlənin]	
nail, *n*	['neɪl]	
papilla, *n*	[pə'pilə]	
sebaceous gland	[sɪ'beɪʃəs ˈglænd]	
secretory function	[sɪ'krɪ:tərɪ ˈfʌŋ(k)ʃ(ə)n]	
skin, *n*	['skɪn]	
stratum, *n*	['stra:təm]	
subcutaneous layer	[ˌsʌbkju:ˈteɪnɪəs ˈleɪə]	
synthesis, *n*	['sɪnθɪsɪs]	
synthesize, *v*	[ˈ sɪnθəsʌɪz]	
sweat gland	['swɛt ˈglænd]	

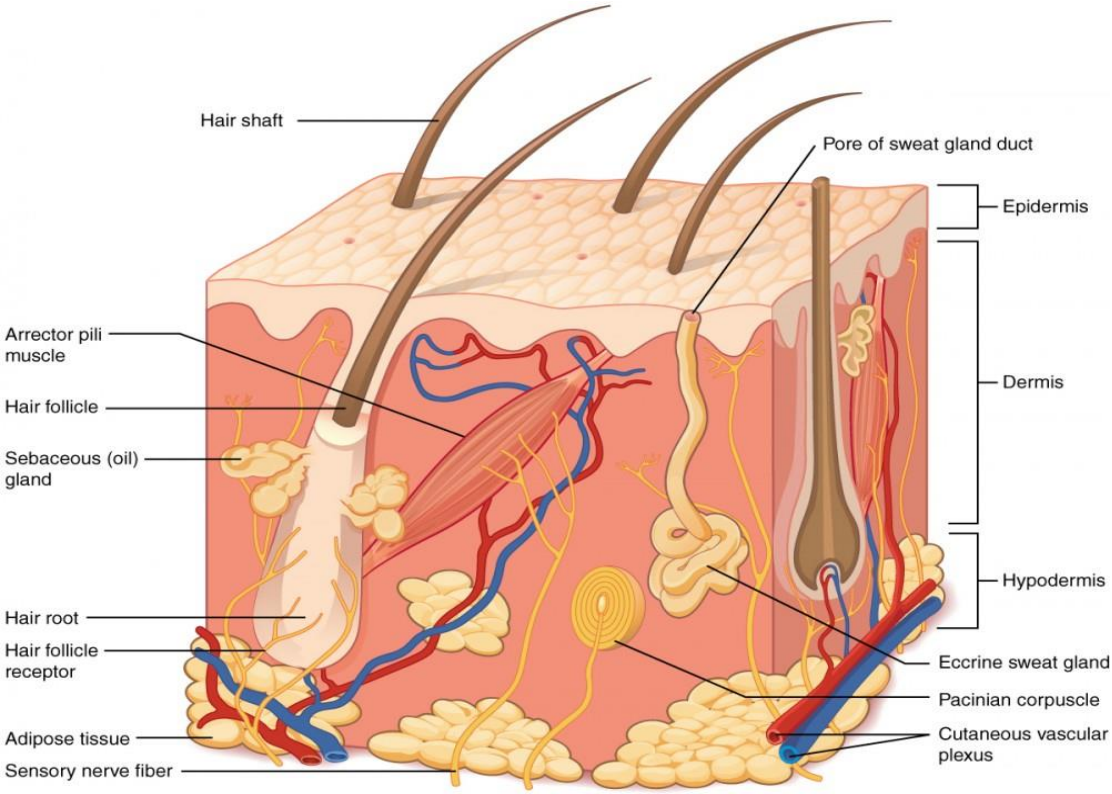
Exercise 2. Choose words from and word-combinations from ex. 1 to fill in the gaps in sentences.

9. Together with the accessory organs (hair, nails and glands) the skin makes up the _____ _____.

10. The _____ is the largest organ in the body.
11. A _____ _____ of tissue binds the skin to underlying structures.
12. The _____ is relatively thin over most areas but is the thickest on the palms of the hands and the soles of the feet.
13. The _____ _____ is the only layer of the epidermis that is composed of living cells.
14. _____ provides a protective barrier from the damaging effects of the sun's ultraviolet radiation.
15. The _____ _____ secrete perspiration (sweat) on the surface of the skin through pores.
16. _____ is found on nearly all parts of the body except for the lips, nipples, palms of the hands, soles of the feet and parts of the external genitalia.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

9. The skin covers and protects all outer surfaces of the body. ___
10. The skin doesn't act as a reservoir for food and water. ___
11. The skin consists of two distinct layers: the epidermis and the dermis. ___
12. The stratum corneum is composed of dead flat cells. ___
13. In the basal layer, special cells called melanocytes produce a white pigment called melanin. ___
14. Each nail is formed in the nail bed. ___
15. The lunula has a whitish appearance. ___
16. Hair growth is related to the amount of pigment produced by epidermal melanocytes. ___



https://s3-us-west-2.amazonaws.com/courses-images-archive-read-only/wp-content/uploads/sites/18/2014/07/19181114/501_Structure_of_the_skin.jpg

The skin, also called integument, is the largest organ in the body. Together with its accessory organs (hair, nails, and glands), the skin makes up the integumentary system. Its elaborate system of distinct tissues includes glands that produce several types of secretions, nerves that transmit impulses, and blood vessels that help regulate body temperature. The skin covers and protects all outer surfaces of the body and performs many vital functions, including the sense of touch.

The skin protects underlying structures from injury and provides sensory information to the brain. Beneath the skin's surface is an intricate network of nerve fibers that register sensations of temperature, pain, and pressure. Other important functions of the skin include protecting the body against ultraviolet rays, regulating body temperature, and preventing dehydration. The skin also acts as a reservoir for food and water. The skin consists of two distinct layers: the epidermis and the dermis. A subcutaneous layer of tissue binds the skin to underlying structures.

The outer layer, the epidermis, is relatively thin over most areas but is the thickest on the palms of the hands and the soles of the feet. Although the epidermis is composed of several sublayers called strata, the stratum corneum and the basal layer, which is the deepest layer, are of greatest importance.

The stratum corneum is composed of dead flat cells. The basal layer is the only layer of the epidermis that is composed of living cells where new cells are formed.

In the basal layer, special cells called melanocytes produce a black pigment called melanin. Melanin provides a protective barrier from the damaging effects of the sun's ultraviolet radiation. Differences in skin color are attributed to the amount of melanin in each cell.

The second layer of the skin, the dermis, lies directly beneath the epidermis. It is composed of living tissue and contains numerous capillaries, lymphatic vessels, and nerve endings. Hair follicles, sebaceous glands, and sweat glands are also located in the dermis.

The subcutaneous layer, also called hypodermis, binds the dermis to underlying structures. It is composed primarily of loose connective tissue and fat tissue interlaced with blood vessels. The subcutaneous layer stores fats, insulates and cushions the body, and regulates temperature.

Two important glands located in the dermis produce secretions: the sweat glands produce sweat and the sebaceous glands produce oil. These two glands are exocrine glands. They secrete substances through ducts to an outer surface of the body.

The sweat glands secrete perspiration, or sweat, on the surface of the skin through pores. Pores are most plentiful on the palms, soles, forehead, and armpits. The main functions of the sweat glands are to cool the body by evaporation, excrete waste products, and moisten surface cells.

The sebaceous glands are filled with cells, the centers of which contain fatty droplets. As these cells disintegrate, they yield an oily secretion called sebum. The acidic nature of sebum helps destroy harmful organisms on the skin, thus preventing infection. Sebaceous glands are present over the entire body except on the soles of the

feet and the palms of the hands. They are on the scalp and face; around the nose, mouth, external ear, and anus; and on the upper back and scrotum.

Hair is found on nearly all parts of the body except for the lips, nipples, palms of the hands, soles of the feet, and parts of the external genitalia. The visible part of the hair is the hair shaft; the part that is embedded in the dermis is the hair root. The root, together with its coverings, forms the hair follicle. Hair color is related to the amount of pigment produced by epidermal melanocytes. Melanin ranges in color from yellow to reddish brown to black.

Nails protect the tips of the fingers and toes from bruises and injuries. Each nail is formed in the nail root and is composed of keratinized stratified squamous epithelial cells producing a very tough covering. As the nail grows, it stays attached and slides forward over the layer of epithelium called the nail bed. Most of the nail body appears pink because of the underlying vascular tissue. The half-moon–shaped area at the base of the nail, is called the lunula. The lunula has a whitish appearance.

Exercise 4. Focus on grammar: Compound nouns.

Some nouns consist of more than one word. These are compound nouns. Compound nouns can be formed in different ways. The most common way is to put two nouns together **(noun + noun);** other common types are **adjective + noun** and **verb + noun**.

Compound nouns normally have the spoken stress on the first part.

noun + noun

armpit, eyelash, eyebrow, fingertip, fingernail, toetip, toenail, sunlight, sunburn.

adjective + noun

redhead, blackhead, lightskin, darkskin.

verb + noun

breakskin

Exercise 5. Use the correct compound nouns.

1. Each human will shed an everage of 40 pounds of skin throughout of a life-threating/life-time.
2. It is known that petechia is the minute lightskin/pinpoint hemorrhage under the skin.
3. Fire, steam, hot water or sunlight/darkskin can cause the burns of the skin.
4. Eyebrows/fingertips have a high concentration of sensory receptors in a small area.
5. Being the organ of tactile perception skin contains tactile receptors in the eyelashes/fingertips and soles of the feet.
6. Share, colour and length of hair fibers in eyebrows/toenails have individual genetic composition. The new hair in them grow every 100 days.
7. Keratin has special waterproof/sunlight characteristic which does not let fluids and moisture to evaporate.
8. Short contact with either dry or moist heat or too much time spent in the sun can cause burns that are called thermal burns and sunlight/sunburns.

Exercise 6. Fill in the table. Check the meaning of new words in a dictionary.

verb	noun	adjective
absorb		absorptive
	perspiration	perspirative
produce	production	
	maintenance	maintained
secrete	secretion	
protect		protective
defend	defence	
grow		grown, growing

Exercise 7. Use the words given in CAPITALS at the end of each line to form a word that fits in the gap in the same line.

1. Skin synthesizes vitamin D needed for the _____ of calcium essential for muscle contraction.	ABSORB
2. Skin provides an alternative route for excreting salts and nitrogenous wastes in the form of _____.	PERSPIRATE
3. Skin also synthesizes vitamin D needed for growth, repair, and _____ of bones.	MAINTAIN
4. Skin is the first line of _____ against the invasion of pathogens in the body.	DEFEND
5. _____ of melanocytes is genetically regulated and, thus, inherred.	PRODUCT
6. Subcutaneous layer of the skin stores adipose tissue when insulin _____ cause excess carbohydrate intake to fat storage.	SECRETE
7. Skin stretches to accommodate the _____ fetus during pregnancy.	GROW
8. Other important functions of the skin include _____ the body against ultraviolet rays, regulating body temperature and preventing dehydration .	PROTECT

Exercise 8. **Focus on grammar: Compound nouns.**

Complete the sentences choosing appropriate compound nouns:

eyelashes, sunburn, sunlight, eyebrows, fingernails, armpits, waterproof, ringworm, fingernails and toenails

1. Even chewed _____ may be a clue to emotional problems.
2. Basal cell carcinoma is commonly caused by overexposure to _____.
3. The eye is protected by a bony socket or orbit, the eyelids, _____, _____ and tears.
4. Over sun exposure results in a _____.
5. Pores are the most plentiful on the palms,soles,forehead and _____.
6. _____ is a common type of dermatomycosis.

7. It is estimated that _____ and _____ grow an average of two centimeters every year.
8. Sebum spreads across the skin and enables it to become _____.

Exercise 9. Make questions with these words.

Ask and answer the questions in pairs.

9. What / the integumentary system / consist of?
10. What / the skin / cover, protect and perform?
11. What / the skin / consist of?
12. How / the skin / also act?
13. What / two important glands / located in the dermis produce?
14. Where / hair / find?
15. How / melanin / range?
16. What / nails / protect?

Exercise 10. Medical vocabulary: combining forms .

Study the meaning of **combining forms**:

Combining form	an-	dia-	sub-	epi-	cyte-	derma-
Meaning	without, not	through, across	under, below	above, upon	cell	skin

Match medical term elements 1-6 to their definitions a-f.

1 lipocyte, 2 subungual, 3 epidermis, 4 anhidrosis, 5 pyoderma, ***6 diaphoresis.***

a excessive or profuse sweating - ***6. diaphoresis***

b pertaining to beneath the nail of a finger or toe - _____

c pus in the skin - _____

d above the skin - _____

e fat cell - _____

f abnormal condition of absence of sweat - _____

Supplementary tasks

Exercise 1. Read and translate the text about interesting facts of the integumentary system .

- The entire body is covered with skin. This surface area is between 1.5 m^2 and 2 m^2 .
- Skin makes up approximately 7 percent of the body's weight. It weighs approximately 4 kg.
- It's estimated that approximately 70 percent of household dust is made up of shed human skin.
- Between 30,000 and 40,000 dead skin cells drop off the body every minute.
- Nails grow an average of two centimeters every year, and fingernails grow almost four times as fast as toenails.
- There are approximately 10,000 hairs on a human head, with each hair growing a rate of five inches a year.
- Human hair is virtually impossible to destroy; it is resistant to extreme cold and heat (except for burning), water, and many types of acids and chemicals.
- Over the course of a lifetime, each human will shed an average of 40 pounds of skin.
- On average, each person loses between 80 and 100 hairs every day.
- Each human scalp has an average of 100,000 hairs.

Exercise 2. Read the sentences and decide which answer A, B, C, D of best fits each space.

1. The tissue of the dermis is _____.

2. With age, the elastin fibers _____ _____, meaning that this elasticity undergoes deterioration, which results in wrinkles.

3. It is important to understand the skin's ability to _____ itself.

4. The epidermis is the skin's _____ layer, while the dermis is the inner layer.

5. The collagen fibers are _____, while the elastin fibers are flexible.

6. The papillary layer is located _____ the epidermis and the dermis.

7. The skin's _____ organs include the hair and nail follicles, sensory receptors, and various glands.

A mucous	B serous	C fibrous	D sebaceous
A bind	B break down	C connect	D make up
A heal	B produce	C repair	D disrupt
A inner	B central	C inside	D outer
A thin	B mobile	C strong	D thick
A between	B under	C around	D above
A main	B accessory	C primary	D similar

Exercise 3. Translate into Ukrainian.

A 12-year-old patient was brought to the hospital with white nonpigmented spots on the skin. The spots appeared at the age of 10 and constantly enlarged. These sports appeared due to the lack of the following skin cells:

_____

_____

_____

_____

_____

_____

_____

_____

A Labrocytes	C Plasmocytes	E Fibrocytes
B Melanocytes	D Adipocytes	

_____

_____

_____

Exercise 4. Translate into English.

Хлопчик 2-х років поступив у лікарню з висипанням на тулубі. При обстеженні було виявлено рожевий, плямисто-папульозний висип на грудній клітці, шиї та руках. За день до цього він мав температуру. Визначте це захворювання.

A Дитяча розеола	C Корова краснуха	E Скарлатина
B Кір	D Інфекційна еритема	

Exercise 5. Study the abbreviations and write their meaning in the table.

Abbreviation	Meaning
Derm	
ID	
subcu, Sub-Q, subQ	
XP, XDP	
IS	
IT	
PT	
SD	
SLF	

UNIT 14

THE CHEMICALS AND CELLS OF LYMPHATIC SYSTEM

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the meaning of the words in the table.

lymphatic, *v*	[lɪmˈfatɪk]	
resistance, *n*	[rɪˈzɪst(ə)ns]	
capillary, *n*	[kəˈpɪlərɪ]	
vessel, *n*	[ˈvɛs(ə)l]	
supply, *n*	[səˈplʌɪ]	
nutrient, *n*	[ˈnjuːtrɪənt]	
circulatory system, *n*	[ˈsəːkjʊlət(ə)rɪ]	
cellular component, *n*	[ˈsɛljʊlə] [kəmˈpəʊnənts]	
fragile, *adj*	[ˈfradʒʌɪl]	
response, *n*	[rɪˈspɒns]	
target, *n*	[ˈtɑːgɪt]	
fluid, *n*	[ˈfluːɪd]	
secrete, *v*	[sɪˈkriːt]	
enzyme, *n*	[ˈɛnzʌɪm]	
bacterial, *adj*	[bakˈtɪərɪəl]	
epithelial cell, *n*	[ˌɛpɪˈθiːlɪ(ə)l] [sɛl]	
antimicrobial, *adj*	[ˈantimʌɪˈkrəʊbɪəl]	
invade, *v*	[ɪnˈveɪd]	

Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

1.The _____ content of the lymphatic system is actually derived from the circulatory system.

2. A _____ is a substance that causes a chemical reaction to take place more quickly.

3.The surface cells of the body, called the epithelia, are most often the first to experience an attack by an _____organism.

4.Most people are familiar with the immune system as it provides _____ to disease.

5.The vessels of the lymphatic system actually represent a separate _____ in the human body.

6.The body secretes an _____ called lysozyme in the saliva and tears.

7.Capillaries are _____ structures, whose walls are typically only one cell thick.

8.There are small pores between the cells that form the lining of the _____.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

1.The lymphatic system is a complex group of cells, tissues and organs. ___

2.The lymphatic system has two primary functions. ___

3.Modern diseases such as acquired immunodeficiency syndrome (AIDS) and sudden acute respiratory syndrome (SARS) greatly challenge the capabilities of our immune system. ___

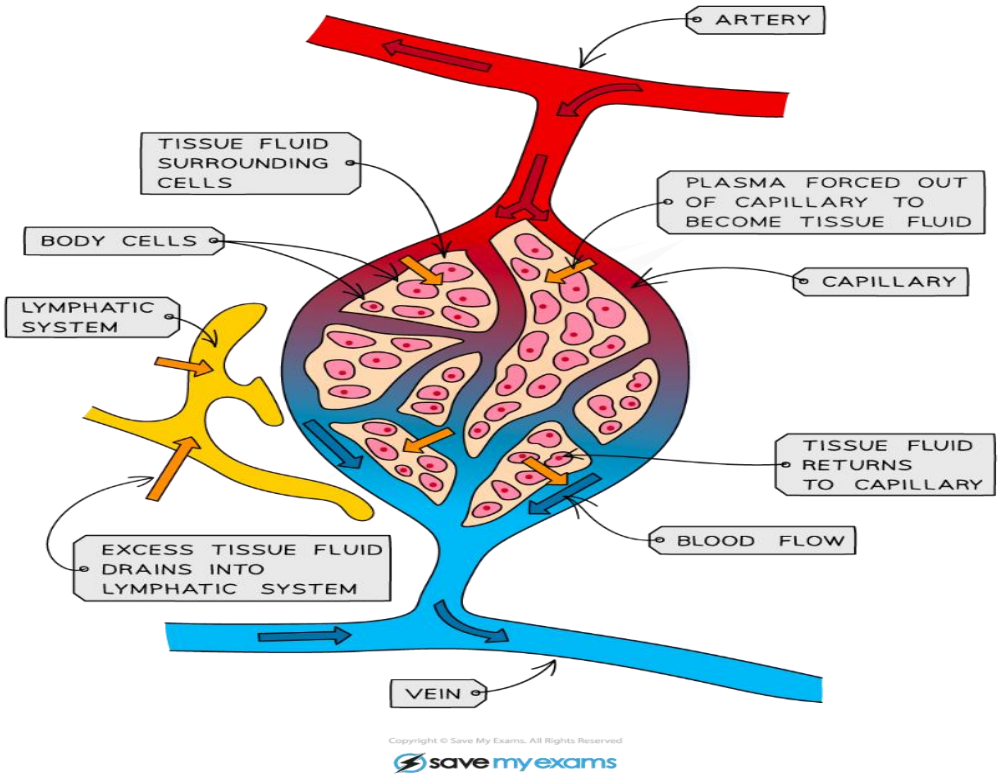
4.From an evolutionary perspective, complement proteins probably do not represent the simplest and oldest form of immune system. ___

5.There are approximately20different types of complement proteins in humans; collectively, they are called the complement system. ___

6.Although complement proteins are found in the circulatory system, they are considered to be part of the lymphatic system due to their association with the immune response.

7.The surface cells of the body, called the epithelia, are most often the second to experience an attack by an invading organism.

8.In most people, the lymphatic system returns around 3.17 quarts (4 liters) of fluid daily.



https://cdn.savemyexams.co.uk/wp-content/uploads/2020/01/How-lymph-forms.png

The Chemicals and Cells of the Lymphatic System

The lymphatic system is a complex group of cells, tissues, and organs that are widely dispersed throughout the human body. The lymphatic system has three primary functions. First, its cells are primarily responsible for the immune response of the body. For this reason, the lymphatic system is frequently called the immune system. Modern diseases such as acquired immunodeficiency syndrome (AIDS) and sudden acute respiratory syndrome (SARS) greatly challenge the capabilities of our immune system. Second, the vessels of the lymphatic system actually represent a separate circulatory system in the human body. The lymphatic system does not directly supply nutrients or oxygen to the tissues of the body, but rather is primarily involved in the return of fluids from the tissues. Finally, it is involved in the transport of select nutrients from the digestive system to the circulatory system.

Subcellular components of the lymphatic system complement proteins are nonspecific components of the lymphatic system which complement or assist in the function of the immune response. They do not recognize specific types of pathogens entering the body, but instead target any form of invading bacteria or fungus. From an evolutionary perspective, complement proteins probably represent the simplest and oldest form of immune system. Forms of complement proteins are found in all animals. There are approximately 20 different types of complement proteins in humans; collectively, they are called the complement system. Although complement proteins are found in the circulatory system, they are considered to be part of the lymphatic system due to their association with the immune response.

The surface cells of the body, called the epithelia, are most often the first to experience an attack by an invading organism. For this reason, many of the body's surfaces secrete antimicrobial proteins or enzymes.

The fluid content of the lymphatic system is actually derived from the circulatory system. It recycles the interstitial fluid and returns it back to the circulatory system. In most people, the lymphatic system returns around 3.17 quarts (3 liters) of fluid daily. In other words, the output of the circulatory system to the tissues is matched by the input of interstitial fluid from the lymphatic system. Lymphatic fluid does not contain red blood cells but there are plenty of ions, molecules, and cells in lymphatic fluid. These include ions such as sodium (Na+) and potassium (K+), chylomicrons, and a host of cells associated with the immune response.

Exercise 4. Focus on grammar: Complex subject.

Complex Subject is the construction containing a noun or a personal pronoun plus the infinitive (*Noun/ Pronoun + Predicate + Infinitive). Two parts of the subject are separated by the predicate.*

e.g. The patient <u>is said</u> to have severe headaches.

The predicate can be represented by:

-verbs of sense perception: to see, to hear…

-verbs of mental activity: to know, to suppose…

-*verbs of inducement: to order, to cause, to allow…*

-*verbs of saying: to say, to report, to announce (in passive voice).*

Look at these sentences and find Complex subject.

The fluid content of the lymphatic system is known to be derived from the circulatory system.

Capillaries are known to be fragile structures, whose walls are typically only one cell thick.

Phospholipids are known not to store energy.

Lymphatic fluid is sure not to contain red blood cells, and in general lacks any pigmentation.

Exercise 5.Write down the sentences, using "*to know*" in Complex subject.

1. The lymphatic system is a complex group of cells, tissues, and organs that are widely dispersed throughout the human body.
2. The lymphatic system has three primary functions.
3. Lymphatic cells are primarily responsible for the immune response of the body.
4. The lymphatic system is frequently called the immune system.
5. Most people are familiar with the immune system as it provides resistance to bacteria.
6. Complement proteins move throughout the circulatory system in an inactive form.
7. Fluids of the lymphatic system actually represent a separate circulatory system in the human body.
8. Forms of complement proteins are found in all people and animals.

Exercise 6. Find in the article the words to fill in the table. Check the meaning of new words in a dictionary.

verb	noun	adjective
	resistance	resistant

carry		carrying
represent	representation	
invade		invading
flow	flow	
	concern	concerning
circulate		circulating, circulatory
call	call	

Exercise 7. Use the word given in capitals at the end of each line to form a word that fits in the gap in the same line.

1.The lymphatic vessels (or lymph vessels or lymphatics) are thin-walled vessels (tubes) structured like blood vessels, that _____ lymph.	CARRY
2. Lymph vessels are devoted to the propulsion of the lymph from the lymph capillaries, which are mainly _____ with absorption of interstitial fluid from the tissues.	CONCERN
3. Lymph vessels that carry lymph to a lymph node are _____ afferent lymph vessels.	CALL
4. Lymph ducts drain the lymph into one of the subclavian veins and thus return it to general _____.	CIRCULATE
5.Generally, lymph _____ away from the tissues to lymph nodes.	FLOW
6.The immune system provides _____ to bacteria	RESISTANT
7. The surface cells of the body, called the epithelia, are most often the first to experience an attack by an _____ organism.	INVADE
8. The capillaries _____ the location where gas and nutrient exchange is most likely to occur.	REPRESENTA-TION

Exercise 8. Focus on grammar: Complex subject.

Look at these sentences .

The students were supposed to read and translate the text about the lymphatic system.

This text of the lymphatic system is expected to be very useful for medical students.

What is a complex subject?

- *A complex subject consists of a noun phrase and any words, phrases, or clauses that modify it.*

Exercise 9. Paraphrase the following sentences using the words in brackets into Complex subject.

1. The surface cells of the body are the first to experience an attack by an invading organism (think).
2. These proteins assist in the function of the immune response (know).
3. The lymphatic system makes up the difference by recycling the interstitial fluid and returning it back to the circulatory system (know).
4. In most people, the lymphatic system returns around 3.17 quarts (3 liters) of fluid daily (suppose).
5. Lymphatic fluid does not contain red blood cells, and in general lacks any pigmentation (expect).
6. Lysozyme acts by degrading the cell walls of invading bacteria (suppose).
7. The fluid content of the lymphatic system is derived from the circulatory system (know).
8. Lymph flows away from the tissues to lymph nodes (suppose).

Exercise 10. Medical vocabulary: combining forms.

Study the meaning of combining forms:

Combining form	cardio-	anti-	patho-	gastro-	h(a)em/o	cholecyst/o
Meaning	heart	opposed to; against	suffering, disease	stomach	blood	gallbladder

Match medical terms 1-6 to their definitions a-f.

1 cardiovascular 2 antimicrobial 3 pathology 4 gastrointestinal 5 hemoglobin 6 cholecystitis

a inflammation of the gall bladder_____

b active against microbes_____

c a red protein responsible for transporting oxygen in the blood _____

d relating to the stomach and the intestines_____

e relating to the heart and blood vessels_____

f the science of the causes and effects of diseases, especially the branch of medicine that deals with the laboratory examination of samples of body tissue for diagnostic or forensic purposes_____

Supplementary reading

Exercise 1. Read the text and answer the questions.

Lymphatic Vessels

The cardiovascular, circulatory system and the principal parts of the lymphatic system interact primarily through the lymph nodes, lymphatics, and lymph capillaries. The lymphatic vessels begin as blindend tubes—called lymph capillaries—that form in the spaces between cells. Lymph capillaries are slightly larger, in addition to being more permeable, than the blood capillaries in the circulatory system. These capillaries can form in most regions of the body, and converge to form larger lymph vessels called lymphatics. These lymphatic vessels have a veinlike appearance, although their walls are thinner and they contain more valves than blood veins. In addition, at various spots in their structure, lymphatics contain lymph nodes.

Lymph is the name of the fluid that enters the lymph capillaries. As explained previously, tissue fluid comes from the filtration in the capillaries.

While the process allows much of this fluid to return to the blood, some of the fluid is lodged in interstitial spaces. The lymphatic vessels return this interstitial fluid to the blood to become plasma again. Without this occurring, blood volume and blood pressure would rapidly decrease, eventually leading to serious health threats, such as a heart attack or stroke.

Lymph Nodes

The lymphatics contain structures that are oval in shape called lymph nodes. These bean-like organs can range in size from 0.04 to 1 inch (1 to 25 millimeters). Blood flows into lymph nodes on the way to subclavian veins. Each lymph node contains a hilum, which is a slight depression on one side where the blood vessels enter and leave the node. Three structural elements form the framework of a lymph node: the capsule, the trabeculae, and the hilum. The capsule is made up of fibrous connective tissue that not only covers the node, but also extends into it.

These extensions into the node are call trabeculae. Inside the node, the outer cortex is composed of tightly packed lymphocytes organized into lymph nodules. These nodules contain germinal centers, where lymphocytes are actually produced. Then the inner portion of the lymph node is called the medulla, which contains lymphocytes that are organized into strands called medullary cords. Lymph nodes contain two kinds of vessels: afferent and efferent. Lymph leaves the node through one or two efferent vessels, while it enters through one or a couple of afferent vessels. Once the lymph is in the node, any bacteria and other foreign materials it is carrying are phagocytized (consumed) by macrophages.

Bone Marrow

The three kinds of blood cells—white blood cells (WBCs), red blood cells, (RBCs), and platelets—are produced in two kinds of hemopoietic tissues: red bone marrow (or simply bone marrow), and lymphatic tissue that is found in the spleen, thymus gland, and lymph nodes. The red bone marrow is spongy tissue found in fat and irregular bones. Basically, the purpose of the RBCs is to carry oxygen throughout

the body. Through a protein that they carry called hemoglobin, RBCs are able to bond to oxygen molecules. Before RBCs are produced in the bone marrow, they are stem cells that are constantly changing to form all kinds of blood cells.

1. Do the cardiovascular, circulatory system and the principal parts of the lymphatic system interact?
2. What do you know about the lymphatic vessels?
3. What is the name of the fluid that enters the lymph capillaries?
4. Find the sentence about the lymph nodes in the text and explain what are they?
5. Name three structural elements which form the framework of a lymph node.
6. What three kinds of blood cells do you know?
7. What do you know about the red bone marrow?
8. What is the basic purpose of the RBCs in the body?(red blood cells)

Exercise 2. Read the text below and decide which answer A, B, C of D best fits each space.

Thymus

In addition to the bone marrow, the second primary 1 _____organ is the thymus, which is located under the sternum in an adult. In a fetus and an infant, however, the thymus gland is 2_____below the thyroid gland, which is an 3_____gland below the larynx. As the body develops and grows, the thymus actually shrinks and 4_____fat tissue, leaving only a small amount of the thymus in adults. The thymus reaches maximum 5 _____during puberty. The T lymphocytes or T cells that are 6 _____in the body to prepare the immune system to perform its primary duties are produced in the thymus. Secondary 7 _____organs in addition to the lymph nodes, thymus, and the bone marrow, the lymphatic system functions with help from five other important 8_____: the spleen, tonsils, adenoid, Peyer's patches, and appendix.

1	**A** lymphatic	**B** urinary	**C** respiratory	**D** immune
2	**A** cut	**B** located	C put	**D** situated
3	**A** exocrine	**B** immune	**C** endocrine	**D** lymphatic

4	**A** becomes	**B** helps	**C** contains	**D** separates
5	**A** volume	**B** size	**C** colour	**D** smell
6	**A** inhaled	**B** visible	**C** vital	**D** toxic
7	**A** exocrine	**B** endocrine	**C** immune	**D** lymphatic
8	**A** nodes	**B** organs	**C** functions	**D** cells

UNIT 15

METABOLISM. METABOLIC DISORDERS. NECROSIS. APOPTOSIS.

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the meaning of the words in the table.

convert,*v*	[kənˈvɜːrt]	
release,*v*	[rɪˈliːs]	
inherit,*v*	[ɪnˈherɪt]	
assembly line	[əˈsembli laɪn]	
generation,n	[ˌdʒenəˈreɪʃn]	
lysosome,*n*	[ˈlʌɪsəsəʊm]	
build up,*v*	[ˈbɪldˌʌp]	
delay,*n*	[dɪˈleɪ]	
Gaucher disease,*n*	[gəʊˈsheɪ]	
platelet,*n*	[ˈpleɪtlət]	
galactosemia,*n*	[gəˈlæktə(ʊ)semia]	
phenylketonuria,*n*	[ˈfiːnʌɪlˈkiːtə(ʊ)nuriə]	
glycogen,*n*	[ˈglʌɪkədʒ(ə)n]	
premature,*adj*	[ˈprɛmətʃə]	
deprivation,*n*	[dɛprɪˈveɪʃ(ə)n]	
avascula,*adj*	[əˈvaskjʊlə]	
gangrene,*n*	[ˈgaŋgriːn]	
nyperthermia,*n*	[ˌhʌɪpəˈθəːmɪə]	
loxoscelism,*n*	[lækˈsæsəlizəm]	
lesion,*n*	[ˈliːʒ(ə)n]	

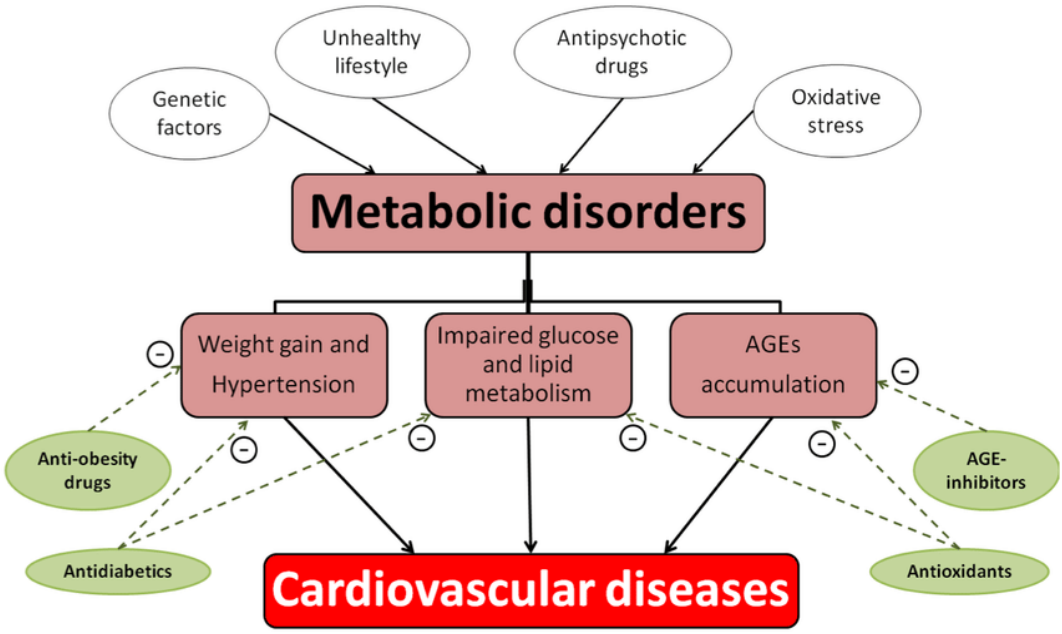
Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

1. Metabolic disorders occur when the body can`t _____ or use properly the energy.

2. Necrosis often leads to _____in the body which is the result of the damaged cells.
3. Metabolic disorders are mostly _____ones, but many of them also occur as a result of body disfunction.
4. Toxic chemicals _____in the body and essential products are not produced when certain enzyme is produced in a form that doesn`t work.
5. Necrosis unlike necrobiosis is caused by _____cell death.
6. Bone pain, enlarged liver, and low _____counts are symptoms of metabolic disorder called Gaucher disease.
7. Lack of blood supply to the affected area result in _____ or _____.
8. _____is an example of biological necrosis.

Exercise 3. Read the text. Find the true sentences and correct the false ones.

1. In most inherited metabolic disorders enzymes are not produced by the body at all.
2. Enzyme absence means that toxic chemicals may build up, or an essential product may not be produced.
3. Each inherited metabolic disorder is widely met in the general population.
4. Reducing or elimination of food or drug intake that can't be metabolized properly doesn`t help in treatments for genetic metabolic disorders.
5. The spontaneous natural death or wearing out of tissue is called necrosis.
6. Some injuries and diseases inhibit crucial intracellular metabolic processes, in which intracellular enzymes become activated upon injury and destroy damaged cells.
7. A sudden shift in intracellular and extracellular solute concentrations is known as karyolysis.
8. Necrosis serves as a protective mechanism against disease and other factors.



https://www.researchgate.net/profile/Youssef-Kouidrat-2/publication/278789597/figure/fig1/AS:601758799785995@1520481886974/Fig-1-Main-risk-factors-and-pathways-that-lead-to-metabolic-disorders-and.png

Inherited metabolic disorders are genetic conditions that result in metabolism problems. Most people with inherited metabolic disorders have a defective gene that results in an enzyme deficiency. There are hundreds of different genetic metabolic disorders, and their symptoms, treatments, and prognoses vary widely.

Metabolism refers to all the chemical reactions taking place in the body to convert or use energy. A few major examples of metabolism include transforming excess nitrogen into waste products excreted in urine and breaking down or converting chemicals into other substances and transporting them inside cells.

In most inherited metabolic disorders, a single enzyme is either not produced by the body at all or is produced in a form that doesn't work. The missing enzyme is like an absentee worker on the assembly line. Depending on that enzyme's job, its absence means toxic chemicals may build up, or an essential product may not be produced.

The original cause of most genetic metabolic disorders is a gene mutation that occurred many, many generations ago. Each inherited metabolic disorder is quite rare in the general population.

Various enzyme deficiencies inside lysosomes can result in buildup of toxic substances, causing metabolic disorders like Hurler syndrome, Gaucher disease, Krabbe disease, galactosemia, Maple syrup urine disease, phenylketonuria and others.Treatments for genetic metabolic disorders follow a few general principles: reduce or eliminate intake of any food or drug that can't be metabolized properly; replace the enzyme or other chemical that is missing or inactive, to restore metabolism to as close to normal as possible; remove toxic products of metabolism that accumulate due to the metabolic disorder.

Necrosis is a form of premature tissue death, as opposed to the spontaneous natural death or wearing out of tissue, which is known as necrobiosis. Necrosis is further distinguished from apoptosis, or programmed cell death, which is internally regulated by cells, plays a critical role in embryonic development, and serves as a protective mechanism against disease and other factors.

Examples of physical injuries include cuts, burns, bruises, oxygen deprivation (anoxia), and hyperthermia. Biological injuries can include immunological attack and the effects of disease-causing agents. Notable conditions involving necrotic tissue death include avascular necrosis and gangrene, which result from a lack of blood supply to the affected area; necrotizing fasciitis, which is caused by a rapidly spreading bacterial infection; and loxoscelism, in which venom in a bite from a recluse spider (Loxosceles) produces a gangrenous wound. Such injuries and diseases inhibit crucial intracellular metabolic processes, in which intracellular enzymes become activated upon injury and destroy damaged cells. Lesions caused by necrosis often are of diagnostic value.

Early cellular signs of necrosis include swelling of the mitochondria, a process that impairs intracellular oxidative metabolism. Later, localized densities appear, with condensation of genetic material. Cytoplasmic organelles are disrupted, and affected cells separate from neighbouring cells. The dissolution of lysosomes, which normally

house hydrolytic enzymes, leads to intracellular acidosis, the nucleus swells and darkens (pyknosis) and eventually ruptures (karyolysis). The outer membrane of the cell also ruptures, resulting in a loss of ion-pumping capacity and a rapid flow of sodium and calcium ions into the intracellular environment, resulting in osmotic shock (a sudden shift in intracellular and extracellular solute concentrations).
(Adopted from Encyclopedia Britannica and WebMD.com)

Exercise 4. Focus on grammar: Participle I.

The present participle (Participle I) is formed by adding "ing" to the base form of the verb: examining, coughing, operating, palpating.

The present participle expresses active meaning and can be used in tense formation or as attributes in a sentence.

Read the sentence below and define the functions of Participle I.

When the outer membrane of the cell ruptures it is resulting in a loss of ion-pumping capacity.

Exercise 5. Fill in the gaps with the correct form of the verb in brackets using Participle I and translate the text.

Hereditary fructose intolerance (HFI) is caused by a deficiency of the liver enzyme fructose-1-phosphate aldolase. 1._____(to appear) after the ingestion of fructose and thus 2. _____(to present) later in life symptoms of HFI resemble those of galactosemia. Fructose is present in fruits, table sugar (sucrose), and infant formulas 3. _____(to contain) sucrose. Symptoms 4. _____(to include) failure to gain weight satisfactorily, vomiting, hypoglycemia, liver dysfunction, and kidney defects are presentations of disease. Older children with HFI tend to avoid sweet foods and may have teeth notable for the absence of caries. Children with the disorder do very well 5._____(to avoid) dietary fructose and sucrose.

Lipids are large, water-insoluble molecules that have a variety of biological functions, 6. _____(to include) storing energy and serving as components of cellular membranes and lipoproteins. Cells 7. _____(to line) the small intestine absorb

dietary lipids and process them into lipoprotein particles that enter the circulation via the lymphatic system for eventual uptake by the liver. These lipoprotein particles are 8. _____(to transport) triglycerides, cholesterol, and fat-soluble vitamins through the blood.

Exercise 6. Find in the article in ex. 5 words to fill in the table. Check the meaning of new words in a dictionary

verb	noun	adjective
	acceleration	accelerated
	characteristics	characterised
act		active
	specificity	specific
be efficient	efficiency	
lower		low
consume		consummed
		used
		digested
assist		assisted
	process	

Exercise 7. Use the word given in capitals at the end of each line to form a word that fits in the gap in the same line.

1. The metabolic reactions of the body do not occur spontaneously, but require a catalyst to _____ the rate of the reaction to a point that is efficient for the cells of the body. ACCELERATION

2. These catalysts are called enzymes. While the human body has a wide array of enzymes, they all share some common _____. CHARACTERIZE

3. The three-dimensional shape of enzymatic proteins enables enzymes to_____ with other molecules. ACT

4. Second, enzymes are very _____to the molecules, or substrates, with which they interact.	SPECIFY
5. Third, enzymes all serve to increase the _____of metabolic reactions by _____the amount of energy needed to initiate the reaction.	EFFICIENT LOW
6. Finally, enzymes themselves are not _____or destroyed during the course of an enzymatic reaction, allowing them to be _____over and over again for the same process.	COMSUMMER USE
7. The level of compartmentalization in the human _____ system helps to establish zones of enzyme activity.	DIGEST
8. Enzymes that _____in the_____ of lipids are called lipases, and those that process proteins are called proteases.	ASSISTANT, PROCESS

Exercise 8. Focus on grammar: Participle I – attribute *Participle in the function of an attribute can be used either before the nouns they modify. e.g. The building blocks of proteins are the amino acids.) or after the noun they modify (eg. Amino acids, linking together by the process of dehydration, form proteins.)*

Exercise 9. Combine the nouns with their attributives to receive the meaningful word combinations on the topic.

1. Enzymes, mechanisms, hormones, mechanisms, system, sections, problem, vessels, patient, components.

2. Transporting, debilitating, assisting, circulating, protecting, constricting, missing, processing, dividing, fainting.

Exercise 10. Medical vocabulary : affixation.

Most common ways of affixation include following constructions:

root + combining vowel + root + suffix

e.g. hemophilia : hemo- (blood) + phil- (beloved, loving) + -ia (pathological or abnormal condition) - any of several hereditary blood- coagulation disorders

prefix + root + root + suffix

e.g. hyperglycemia : hyper- (excessive) + glyc-(sweet) + (h)em- (blood) + -ia (condition) - the presence of an abnormally high concentration of glucose in the blood.

Root or suffix	*hemo-*	*phil*	*-ia*	*hyper-*	*glyc-*
Meaning	blood	beloved, loving	pathological or abnormal condition	excessive	sweet

Look at the words below, define the scheme of affixation. Match the words with their definition.

1.intolerance 2.galactosemia 3.avascular 4.hyperthermia 5.loxoscelism 6.phenylketonuria 7. karyolysis 8. pyknosis

a. dissolution of a cell nucleus, especially during mitosis – **7. <u>Karyolysis</u>**
b. an inability to eat a food or take a drug without adverse effects -_____
c. characterized by or associated with a lack of blood vessels- _____
d. the condition of having an abnormally (typically dangerously) low body temperature -_____
e. an inherited disorder of galactose metabolism that occurs in newborns and can result in damage to the liver, brain, kidneys, and other organs -_____
f. Pyknosis, or karyopyknosis, is the irreversible condensation of chromatin in the nucleus of a cell undergoing necrosis or apoptosis-_____
g. an inherited metabolic disorder caused by an enzyme deficiency resulting in accumulation of <u>phenylalanine</u> and its metabolites in the blood-_____
h. a painful condition resulting from the bite of a spider of the genus Loxosceles and especially the brown recluse spider (L. reclusa) that is characterized by local necrosis of tissue and sometimes systemic symptoms of poisoning - _____

Supplementary reading

Exercise 1. Read the text and fill in the table.

Metabolic disorders are health conditions that alter the function of the body's metabolic, or energy-producing, pathways. Among the most common metabolic disorders are diabetes, hyperthyroidism, hypothyroidism, and phenylketonuria

(PKU). Though doctors understand the mechanisms of most metabolic disorders, the causes remain largely unknown. Genetic factors play a significant role and may be the sole cause of certain metabolic conditions such as glycogen-storage disorders (which affect the body's ability to metabolize carbohydrates) and lipid-storage disorders (which affect the body's ability to metabolize fats).

Doctors commonly refer to genetic-based conditions as inborn errors of metabolism. Many of these disorders affect the function of specific enzymes that facilitate the conversion or storage of nutrients to energy within the metabolic pathway. The consequence may affect the body as a whole or the activity of specific kinds of cells such as muscle cells or nerve cells (neurons).

Researchers do not know the extent to which genetic factors influence acquired metabolic conditions such as hyperthyroidism, hypothyroidism, and type 2 diabetes.

Symptoms of metabolic disorders vary depending on how the disorder affects metabolism and may include

- neurologic deficit and development delays
- cardiomyopathy
- hearing loss
- vision disturbances
- myoclonus
- seizures
- weakness or movement difficulties
- failure to thrive

Inborn disorders of metabolism may not become apparent until a child is several months to several years old, by which time the condition often causes significant damage to organ systems.

Newborn screening for some such disorders, such as PKU, is common in the United States and many other countries. Early detection of PKU and many other metabolic disorders allows treatment or management, such as enzyme replacement therapy or dietary restrictions, to prevent the condition from causing damage. However, most genetic disorders of metabolism are not curable at present.

Hormone replacement therapy is the treatment for hypothyroidism and insulin-dependent diabetes. Confirming the diagnosis of metabolic disorders may be as simple as common blood tests, such as for diabetes or hypothyroidism, or may require sophisticated laboratory procedures and genetic (DNA) testing. There are no known methods of prevention for most metabolic conditions. Lifestyle factors such as diet and daily exercise can influence, and often prevent or reduce the severity of, type 2 diabetes.

Continuing advances in genetic and molecular research are allowing scientists to identify gene mutations that underlie a number previously poorly understood syndromes with symptoms of impaired physical and intellectual development. Researchers are hopeful that new findings will result in gene therapy approaches to remedy or prevent the defective metabolic functions.

Metabolic disorder	Symptoms of disorder	Existing treatment

Exercise 2. Read the text below and decide which answer A, B, C of D best fits each space.

The natural mechanism through which a cell 1._____ in actions that lead to its death, often called programmed cell death or cell 2._____. Apoptosis appears linked to senescence, an inherent limitation on the 3. _____of times a cell can divide. Both apoptosis and senescence play significant roles in the 4._____process. Once

the cell initiates apoptosis there is no reversal; the process proceeds until the cell dies. Apoptosis begins when the cell's DNA fragments, signaling or switching the rest of the process in motion. Once 5._____ apoptosis sets in motion the subsequent events result in the cell's dismantling, assimilation, and recycling. In some respects cells become endlessly renewable resources for the body. Specialized cells 6._____ phagocytes break down dying and dead cells into basic components such as amino acids that other the body can use to construct new cells. Apoptosis is necessary for growth, development, and change in the body. The process of the death of cells that experience injury or damage is called 7._____ and by definition occurs outside the natural order of cell life expectancy. 8._____, rather than intrinsic, factors initiate necrosis.

1	A takes part	B participates	C engages	D involves
2	A suicide	B birth	C appearance	D immerging
3	A quality	B quantity	C size	D number
4	A treatment	B diagnosing	C imaging	D aging
5	A detected	B activated	C mentioned	D seen
6	A called	B known	C thought	D described
7	A apoptosis	B neurosis	C cirrhosis	D necrosis
8	A outer	B inner	C extrinsic	D unknown

Exercise 3. Translate into Ukrainian.

A child with point mutation presents with absence of glucose 6-phosphatase, hypoglycemia, and hepatomegaly. What pathology are these signs characteristic of?

A. Von Gierke's disease (Glycogen storage disease type I)

B. Cori's disease (Glycogen storage disease type III)

C. Addison's disease (Primary adrenal insufficiency)

D. Parkinson's disease

E. McArdle's disease (Glycogen storage disease type V).

_____

_____

_____

_____

_____

_____

Exercise 4. Translate into English.

Під час видалення гіперплазованої щитовидної залози 47-річної жінки була пошкоджена паращитовидна залоза. Через місяць після операції пацієнт розвинув симптоми гіпопаратиреозу: часті конвульсії, гіперрефлексії, ларингоспазм. Яка найбільш вірогідна причина захворювання пацієнта?

A. Гіпокальціємія

Б. Гіпонатріємія

C. Гіперхлорхімія

D. Гіпофосфатемія

E. Гіперкаліємія

_____

_____

_____

_____

_____

_____

_____

_____

Exercise 5. Study the abbreviations and write their meaning in the table.

Abbreviation	Meaning
PKU	
DM-2	

IDDM	
LDH	
NIDDM	
MET	
BMI	
APLS	

UNIT 16

HYPERTROPHY. DYSPLASIA. DYSTROPHY. INFLAMMATION

Exercise 1. Which of these words do you know? Check new words in a dictionary. Write the translation of the words in the table.

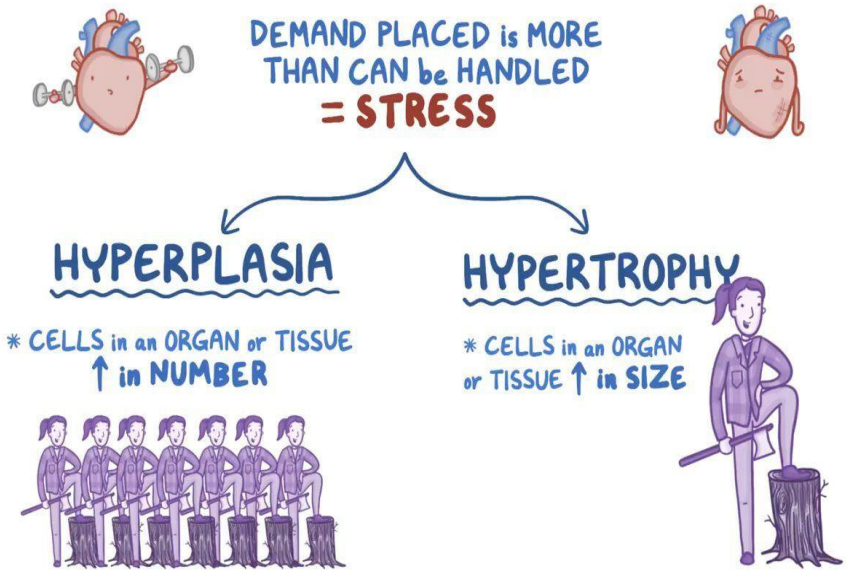
altered *adj*	['ɔ:ltəd]	
debris *n*	['deɪbri:]	
Duchenne dystrophy *n*	[du:ˈʃɛn]	
eccentric *adj*	[ɪk'sentrɪk]	
elimination *n*	[i,limi'neiʃ(ə)n]	
excessive *adj*	[ɪk'sesɪv]	
gradual atrophy *adj/n*	['grædʒʊəl 'ætrəfɪ]	
hormonally-induced *adj*	[ɪn'dju:st]	
hyperplasia *n*	[ˌhʌɪpəˈpleɪzɪə]	
hypertrophy *n*	[haɪ'pɜ:trəfɪ]	
innate *adj*	[ɪ'neɪt]	
inflammation *n*	[ˌɪnflə'meɪʃ(ə)n]	
invasion *n*	[ɪn'veɪʒ(ə)n]	
lesion *n*	['li:ʒ(ə)n]	
malignant *adj*	[mə'lignənt]	
myasthenia gravis *n/adj*	[ˌmʌɪəsˈθi:nɪə gravɪs]	
myelodysplastic syndrome *adj/n*	[ˌmʌɪələ(ʊ)dɪsˈplastɪk]	
poikilocytosis *n*	[ˌpɔɪkɪlə(ʊ)sʌɪˈtəʊsɪs]	
proliferation *n*	[prəˌlɪfəˈreɪʃn]	
simultaneous *adj*	[sim(ə)l'teiniəs]	
straightforward *adj*	[streit'fɔ:wə]	

Exercise 2. Choose words from ex. 1 to fill in the gaps in sentences.

1. The increase in the volume of an organ or tissue due to the enlargement of the size of cells is _____.
2. In _____ the cells remain approximately the same size but increase in number.
3. Increased numbers of immature cells in the bone marrow and a decrease in mature cells in the blood are called _____ _____.
4. _____ means abnormally shaped cells.
5. Muscular dystrophy characterized by _____ _____ and weakening of muscle tissue is a genetic disease.
6. Muscular dystrophy and _____ _____ belong to muscle disorders.
7. _____ _____ is more common disease in males than in females.

Exercise 3. Find the true sentences and correct the false ones.

1. Inflammation is part of the complex biological response of body tissues to harmful stimuli, such as pathogens, damaged cells, or irritants.
2. The signs of inflammation are cough, pain, weakness, headache and tumour.
3. Inflammation can be classified as either strong or weak.
4. Prolonged inflammation, known as chronic inflammation, leads to an increased movement of plasma and leukocytes.
5. The function of inflammation is to eliminate the initial cause of cell injury, clear out necrotic cells and tissues damaged from the original insult and the inflammatory process.
6. Eccentric hypertrophy is applied especially to the left ventricle of heart.
7. Inflammation initiates tissue repair.
8. Inflammation is a protective response involving immune cells, skin, blood vessels, and molecular mediators.



https://www.google.com/url?sa=i&url=https%3A%2F%2Fwww.osmosis.org%2Flearn%2FHyperplasia_and_hypertrophy&psig=AOvVaw0oHSIPSZbJiIxMlsC_UwNb&ust=1636643292254000&source=images&cd=vfe&ved=0CAsQjRxqFwoTCLjy_8aJjvQCFQAAAAAdAAAAABAD

Hypertrophy is the increase in the volume of an organ or tissue due to the enlargement of its component cells. It is distinguished from hyperplasia, in which the cells remain approximately the same size but increase in number. Although hypertrophy and hyperplasia are two distinct processes, they frequently occur together, such as in the case of the hormonally-induced proliferation and enlargement of the cells of the uterus during pregnancy. Eccentric hypertrophy is a type of hypertrophy where the walls and chamber of a hollow organ undergo growth in which the overall size and volume are enlarged. It is applied especially to the left ventricle of heart.

Dysplasia is a term used in pathology to refer to an abnormality of development or an epithelial anomaly of growth and differentiation (epithelial dysplasia). Myelodysplastic syndromes, or dysplasia of blood-forming cells, show increased numbers of immature cells in the bone marrow, and a decrease in mature, functional cells in the blood. Dysplasia is characterized by four major pathological microscopic changes: anisocytosis (cells of unequal size), poikilocytosis (abnormally shaped cells),

hyperchromatism (excessive pigmentation) and presence of mitotic figures (an unusual number of cells which are currently dividing). Dysplasia is the earliest form of precancerous lesion which pathologists can recognize in a pap smear or in a biopsy. Dysplasia can be low grade or high grade. The risk of low-grade dysplasia transforming into high-grade dysplasia, and eventually cancer, is low. Treatment is usually straightforward. High-grade dysplasia represents a more advanced progression towards malignant transformation.

The second-most common lethal genetic disease for a child to be born with is muscular dystrophy. Dystrophy is an abnormal condition caused by improper nutrition or altered metabolism. Muscle disorders involving the muscles include muscular dystrophy and myasthenia gravis. Muscular dystrophy, a genetic disease, is characterized by gradual atrophy and weakening of muscle tissue. The most common type of muscular dystrophy, Duchenne dystrophy, affects children, boys more commonly than girls. One in 3,300 male babies is born with Duchenne muscular dystrophy. It is transmitted as a sex-linked disease passed from mother to son. As muscular dystrophy progresses, the loss of muscle function affects not only skeletal muscle but also cardiac muscle. At present, there is no cure for this disease, and most children with muscular dystrophy die before age 30.

Inflammation is part of the complex biological response of body tissues to harmful stimuli, such as pathogens, damaged cells, or irritants, and is a protective response involving immune cells, blood vessels, and molecular mediators. The five classical signs of inflammation are heat, pain, redness, swelling, and loss of function. Inflammation is a generic response, and therefore it is considered as a mechanism of innate immunity, as compared to adaptive immunity, which is specific for each pathogen. Acute inflammation is the initial response of the body to harmful stimuli and is achieved by the increased movement of plasma and leukocytes (especially granulocytes) from the blood into the injured tissues. Prolonged inflammation, known as chronic inflammation, leads to a progressive shift in the type of cells present at the site of inflammation, such as mononuclear cells, and is characterized by simultaneous destruction and healing of the tissue from the inflammatory process.

Exercise 4. Focus on grammar: *PARTICIPLE II*

Learn the rule and complete the scheme:

Participles are forms of verbs that can modify nouns or act as adjectives or even pronouns. Participles are used with the auxiliary verbs "be" and "have." Past participle (participle 2) is formed by adding "d" or "-ed" to a regular verb. Past participles are used with auxiliary verbs to talk about the past or they can have passive meanings when used as adjectives or adverbs.

We make Participle 2 with:

"___" and "___" in present/past + ___

Exercise 5. Complete the following sentences with past participle based on the verb in brackets.

1. Ann has _____ (recover) from the virus she caught while on vacation.
2. The x-ray proves he has a _____ (collapse) lung.
3. The patient had _____ (damage) spine and _____ (break) leg after the accident.
4. These _____ (specialize) cells detect organisms harmful to the body.
5. The human body is often _____ (describe) as a large vessel containing chemicals that constantly are reacting with one another.
6. Plasma is water _____ (find) within the blood vessel.
7. _____ (Specialize) fluids that perform a specific function, depending on the system in which they are _____ (locate), include water.
8. These old and failing red blood cells are _____ (eat) and _____ (digest) by the macrophages.

Exercise 6. Make the derivatives of words to fill in the table. Check the meaning of new words in a dictionary.

verb	noun	adjective
	usage	
apply		

		damaged
consider		
achieve		
characterize		
	transmission	

Exercise 7. Use the word given in capitals at the end of each line to form a word that fits in the gap in the same line.

1. Inflammation is a mechanism used by the body to protect against invasion by foreign organisms and to repair injured tissue.	USAGE
2. Acute inflammation is _____ by the increased movement of plasma and leukocytes to respond to harmful stimuli.	ACHIEVEMENT
3. A generic response is _____ as a mechanism of innate immunity.	CONSIDERATION
4. Complex biological response of body tissues to harmful stimuli, such as pathogens, _____ cells or irritants includes inflammation.	DAMAGE
5. Haemophilia is _____ as a sex-linked disease from mother to son.	TRANSMISSION
6. Four major pathological microscopic changes _____ dysplasia.	CHARACTER
7. The overall size and enlarged volume are usually _____ especially to the left ventricle of heart.	APPLICATION

Exercise 8. Fill in the gaps with the passive form of the verb in brackets.

Hypertrophy is the process in which muscles grow large when 1_____ (exercise). True muscle hypertrophy lasts as long as the muscle is in regular use. The muscle 2 _____ (not use) regularly, decreases. The terms hip dysplasia, fibrous dysplasia, and renal dysplasia are 3 _____ (refer) to an abnormal development, at macroscopic

or microscopic level. Inflammation can be 4 _____ (classify) as either acute or chronic. Chronic inflammation may lead to a host of diseases, such a hay fever, periodontitis, atherosclerosis, rheumatoid arthritis, and even cancer. Inflammation is one mechanism 5 _____ (use) by the body to protect against invasion by foreign organisms and to repair 6 _____ (injure) tissue. The inflammation of body tissue is 7 _____ (explain) as a nonspecific response to tissue injury or pathogen invasion. The inflammatory response has three primary goals. The function of inflammation is to eliminate the initial cause of cell injury, to clear out necrotic cells and tissues 8 _____ (damage) from the original insult and the inflammatory process and to initiate tissue repair.

Exercise 9. Make questions with these words. Ask and answer them in pairs.

1. What / prolonged / inflammation / do / a / lead / to?
2. Prolonged / inflammation / what / characterize / be / by?
3. What / do / dysplasia / a term / refer / to?
4. What / hypertrophy / be?
5. Why / be / hyperplasia / distinguish / from / hypertrophy?
6. How / be / dysplasia / recognize / can/?

Exercise 10. Medical vocabulary: combining forms.

Study the meaning of combining forms:

Prefix	*hyper-*	*dys-*	*dis-*	*en-*	*trans-*
Meaning	redundancy, thickening, complicity	abnormal, insufficient	division absence, lack	inside, inner	movement, passing, exceedance

Match medical terms 1-10 to their definitions a-j.

1 hypertrophy 2 dysplasia 3 dystrophy 4 transmission 5 enlargement, 6 hyperplasia 7 inflammation 8 destruction

a A serious disease in which your muscles gradually weaken is - _____

b the increase in the volume of an organ or tissue due to the enlargement of its component cells - _____

c the process or result of making something bigger - _____

d the act of destroying something, or the state of being destroyed - _____

e the passing or sending something to a different person or place - _____

f a localized physical condition in which a part of the body becomes reddened, swollen, hot, and often painful, especially as a reaction to injury or infection - _____

g the presence of cells of an abnormal type within a tissue, which may signify a stage preceding the development of cancer - _____

h the enlargement of an organ or tissue caused by an increase in the reproduction rate of its cells, often as an initial stage in the development of cancer - _____

Supplementary Tasks

Exercise1. Read the texts.

Inflammation is the body's response to injury. It works to heal wounds, but it can also play a role in some chronic diseases. Inflammation is a vital part of the body's immune response. Inflammation is often characterized by redness, swelling, warmth, and sometimes pain and some immobility. Arteries dilate, blood flow increases, and capillaries become more permeable so that white blood cells, hormones and nutrients can move into the spaces between cells. Swelling happens because fluid accompanies the white blood cells, hormones and nutrients. There are two types of inflammation: acute and chronic (systemic) inflammation. Acute inflammation arises after a cut or scrape in the skin, an infected ingrown nail, a sprained ankle, acute bronchitis, a sore throat, tonsillitis or appendicitis. It is short-term and subsides after a few days. Chronic inflammation is long-term and occurs in osteoarthritis, and autoimmune diseases, such as lupus and rheumatoid arthritis, allergies, asthma, inflammatory bowel disease and Crohn’s disease. Such factors as excess weight, poor diet, lack of exercise, stress, smoking, pollution, poor oral health and excessive alcohol consumption can also lead to chronic inflammation. The most common anti-inflammatory drugs are over-the-

counter medications such as aspirin, naproxen and ibuprofen. They are used to treat fever, pain, swelling and for short-term afflictions like headaches, fevers associated with colds and flues, menstrual periods and strained or sprained muscles.

Hyperplasia refers to an increase in the number of cells within a given tissue as a result of cellular proliferation. The cell appears normal in size, but can lead to an enlargement of an organ or tissue. Such proliferation occurs in response to a particular stimulus and remains under mechanisms of regulation by the cell. In some cases, hyperplasia can be a pathological response to abnormal levels of growth factors or hormones, resulting in a number of disorders. Hyperplasia increases the risk of cancer due to unregulated cellular proliferation in the absence of physiological stimuli.

Causes of hyperplasia include the demand for increased tissue to compensate for a loss of cells (e.g., the skin or wound healing), chronic inflammation, hormones, growth factors, and diseased tissue within the body. Some forms of hyperplasia are required as the replacement of skin cells and in the breasts of pregnant women for the growth of the milk glands in order to breastfeed the newborn. The process of hyperplasia is also used (and abused) in various sports for the purpose of increasing the number of skeletal muscle cells to improve athletic performance.

Benign prostatic hyperplasia is an enlargement of the prostate due to hyperplasia of the epithelial and stromal cells comprising the prostate. Such hyperplasia causes the formation of discrete nodules on the prostate which can eventually obstruct the bladder, causing complications such as bladder stones, kidney disease, and urinary tract infections. Testosterone and its metabolites play a key role in the induction of hyperplasia of the prostate.

Cushing’s disease results from hyperplasia of the adrenal cortex in response to the enhanced secretion of adrenocorticotropic hormone from the anterior pituitary due to the overproduction of hypothalamus corticotrophin releasing hormone or a pituitary adenoma.

Sebaceous hyperplasia involves hyperplasia of the sebaceous glands located in the skin. It is commonly observed in newborn infants and older adults and is characterized by the increased secretion of sebum and formation of yellow-colored

papules on the face. This condition is typically self-resolving, but laser treatments are also available.

Hemi hyperplasia occurs when the growth of one side of the body is greater than that of the other. This condition can result in the generation of limbs that are longer on one side than the other. There are several treatment options ranging from bone lengthening, bone resection, and the insertion of a growth plate in order to correct the condition. Endometrial hyperplasia refers to hyperplasia of the uterine inner lining in response to elevated levels of estrogen. Estrogen can be overproduced in obesity, various cancers, and polycystic ovary syndrome and hormone therapy. This condition is associated with an increased risk of cancer.

Hypertrophy is an enlargement or overgrowth of an organ or part of the body due to the increased size of the constituent cells. Hypertrophy is an increase in muscular size. Muscle hypertrophy, also known as hypertrophy, is related to hypertrophic cardiomyopathy and myostatin-related muscle hypertrophy, and has symptoms including cachexia, cyanosis and dyspnea. Affiliated tissues include skeletal muscle, smooth muscle and bone. The drugs Acetylcholine and Lidocaine are used in the context of this disorder.

Muscular dystrophy is a group of diseases that cause progressive weakness and loss of muscle mass. In muscular dystrophy, abnormal genes (mutations) interfere with the production of proteins needed to form healthy muscle. Specific signs and symptoms begin at different ages and in different muscle groups, depending on the type of muscular dystrophy. The main sign of muscular dystrophy is progressive muscle weakness. There's no cure for muscular dystrophy. Medications and therapy can help manage symptoms and slow the course of the disease.

Duchenne type muscular dystrophy is the most common form of muscular dystrophy. Although girls can be carriers and mildly affected, it's much more common in boys. Duchenne muscular dystrophy (DMD) is caused by an absence of dystrophin, a protein that helps keep muscle cells intact. Symptom onset is in early childhood, usually between ages 3 and 5. The disease primarily affects boys, but in rare cases it can affect girls, first affecting the muscles of the hips, pelvic area, thighs and shoulders,

and later the skeletal (voluntary) muscles in the arms, legs and trunk. By the early teens, the heart and respiratory muscles also are affected. Signs and symptoms may include: frequent falls, difficulty rising from a lying or sitting up position, trouble running and jumping, walking on the toes, large calf muscles, muscle pain and stiffness, learning disabilities.

Signs and symptoms of Becker muscular dystrophy are similar to those of DMD, but are milder and progress more slowly. Symptoms generally begin in the teens but may not occur until the mid-20s or even later. Some types of muscular dystrophy are defined by a specific feature or by where in the body symptoms first begin. Each form of muscular dystrophy is caused by a genetic mutation particular to that type of the disease. Many of these mutations are inherited. But some occur spontaneously in the mother's egg or the developing embryo and can be passed on to the next generation.

Exercise2. Fill in the table below using the texts of ex. 1. Use additional information if necessary.

Name of the disease	Causes of the disease	Symptoms of the disease	Treatment of the disease
Duchenne type muscular dystrophy			
Hemi hyperplasia			
Crohn’s disease			
Hypertrophy			

Exercise 3. Translate into Ukrainian.

A 9-year-old boy is brought to the physician because of progressive weakness and a purple-red discoloration over his cheeks and upper eyelids over the past 8 weeks. His symptoms began shortly after a camping trip, and he now is unable to climb stairs, walk long distances, comb his hair, or dress himself. His mother can recall no tick bites or exposure to poisonous plants. His only medication is a topical corticosteroid for several dry, scaly patches of the skin. He appears weak and lethargic. He has had no change in his weight since his last examination 9 months ago. His temperature is 37.7°C (99.8°F), blood pressure is 110/68 mm Hg, pulse is 105/min, and respirations are 28/min. Examination of the skin shows a purple-red discoloration over the cheeks and eyelids, periorbital edema, erythematous plaques and scales over the elbows and knees, and flat-topped red papules over all knuckles. There is generalized weakness and atrophy of the proximal muscles. Which of the following is the most likely diagnosis?

A. Dermatomyositis

B. Duchenne's muscular dystrophy

C. Eczema

D. Lyme disease

E. Psoriasis

F. Rocky Mountain spotted fever

G. Seborrhoea

H. Systemic lupus erythema

_____

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Exercise 4. Translate into English.

1. У хлопчика 16 років розвинувся ендемічний зоб. Який процес лежить в основі розвитку зобу?

A. Гіперплазія

B. Гіпоплазія

C. Дегенерація

D**.** Гіпертрофія

E. Пухлина

_____

_____

_____

_____

_____

_____

_____

_____

2. Юнак 17-ти років захворів гостро, температура тіла підвищилася до 38,50С, з'явилися кашель, нежить, сльозотеча, виділення з носу. Яке запалення розвинулося у юнака?

A. Катаральне

B. Серозне

C. Фібринозне

D. Гнійне

E. Геморагічне

_____

_____

_____

_____

_____

_____

_____

_____

Exercise 5. Study the abbreviations and write their meaning in the table.

Abbreviation	Meaning
ARMD, AMD	
BMI	
BPH	
DJD	
EMG	
MG	
PID	

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Appendix I. Abbreviations

Abbreviation	Meaning
AAA	Abdominal aortic aneurysm
Abd	abdominal
Abdms(m)(t)(o)	Abdomen without masses, tenderness, organomegaly
ABPM	ambulatory blood pressure measurement
ACE	angiotensin-converting enzyme
ACS	acute coronary syndromes
ACTH	adrenocorticotropic hormone
ADH	antidiuretic hormone (vasopressin)
ADL	activity of daily living
AIP	Acute intermittent porphyria
ALL	Acute lymphocytic leukemia
AML	Acute myelogenous leukemia
APLS	antiphospholipid syndrome
ARMD, AMD	age-related macular degeneration
ARMD, AMD	age-related macular degeneration
AROM	active range of motion
AS	aortic stenosis
AS	alimentary system
AS	alimentary system
ASD	atrial septal defect
ASHD	arteriosclerotic heart disease
BCC	basal cell carcinoma
BM	bowel movement
BM	bowel movement
BMI	body mass index
BMI	body mass index
BMI	body mass index

BP	blood pressure
BPH	benign prostatic hyperplasia; benign prostatic hypertrophy
BPH	benign prostatic hyperplasia; benign prostatic hypertrophy
bpm	beats per minute
BS	breath sounds; bowel sounds
BS	breath sounds; bowel sounds
Bx, bx	biopsy
Bx, bx	biopsy
c	Blood types in ABO blood group
c	with
c/o	complaining of
C&S	culture and sensitivity
CA	cancer; chronological age; cardiac arrest
CABG	coronary artery bypass graft
CAD	coronary artery disease
Cal	calories
Cath	catheter
CBC	Complete blood count
CBC	the complete breakdown of all the cells in your blood.
Cc	cubic centimeter
CCK	cholecystokinin
CHO	carbohydrates
CK	creatine kinase (cardiac enzyme); conductive keratoplasty
CLL	Chronic lymphocytic leukemia
CML	Chronic myelogenous leukemia
CMV	Cytomegalovirus
CNS	Central nervous system

CT	computed tomography
D&V	diarrhoea and vomiting
D&V	diarrhoea and vomiting
Derm	dermatology
DIC	Disseminated intravascular coagulation
diff	Differential count (white blood cells)
DJD	degenerative joint disease
DJD	degenerative joint disease
DM-2	Non-Insulin dependent diabetes mellitus
DOB	Date of Birth
DU	duodenal ulcer
DU	duodenal ulcer
DVT	deep vein thrombosis, deep venous thrombosis
Dx	Diagnosis
EBV	Epstein-Barr virus
EBV	Epstein-Barr virus
ECG	electrocardiogram
EMG	electromyography
EMG	electromyography
eos	Eosinophil (type of white blood cell)
ESR	Erythrocyte sedimentation rate
ETT	exercise tolerance test
FH	family history
FS	frozen section
FSH	follicle-stimulating hormone
GB	gall bladder
GH	growth hormone
GI	gastrointestinal system
GIP	gastric inhibitory peptide

GIS	gastro-intestinal system
GIS	gastro-intestinal system
GTT	glucose tolerance test
H	hydrogen ions
H&P	history and physical
HCl	hydrochloric acid
HDN	Hemolytic disease of the newborn
HEV	Hepatitis E virus
HF	heart failure
HIV	Human immune virus
HMD	hyaline membrane disease
HS	Herpes simplex
HSE	Herpes simplex encephalitis
HSV	Herpes simplex virus
HTN	hypertension
I&D	incision and drainage
ID	intradermal
ID	intradermal
IDDM	Insulin dependent diabetes mellitus
ITP	Idiopathic thrombocytopenic purpura
IU	international unit
LDH	Lactate dehydrogenase
LH	luteinizing hormone
LIH	left inguinal hernia
LIH	left inguinal hernia
LKS	liver, kidney and spleen
LKS	liver, kidney and spleen
M/F	Male/Female

MCHC	Mean cell hemoglobin concentration (average concentration of hemoglobin in a singlered cell)
MDI	multiple daily injection
MET	metabolic equivalent
MG	myasthenia gravis
MG	myasthenia gravis
MI	myocardial infarction
MSH	melanocyte-stimulating hormone
MVP	mitral valve prolapse
NIDDM	non-insulin dependent diabetes mellitus
NK cell	natural killer cell
NPH	neutral protamine Hagedorn (insulin); no previous history; normal pressure hydrocephalus; nothing by mouth
NSAID	nonsteroidal anti-inflammatory drug
NYD	not yet diagnosed
O/E	on examination
OD	overdose; occupational disease
OT	oxytocin; objective test
PGH	pituitary growth hormone
PH	past history
PID	pelvic inflammatory disease
PKU	phenylktonuria
PRL	prolactin
PT	prothrombin time; patient
PTCA	percutaneous transluminal coronary angioplasty
PTH	parathyroid hormone
PTT	partial thromboplastin time
PUD	peptic ulcer disease
qPM	every afternoon
RAI	radioactive iodine
RAIU	radioactive iodine uptake
RBC	red blood cell
RIA	radioimmune assay; radioactive immunoassay

RNA	ribonucleic acid
RVH	right ventricular hypertrophy; renal vascular hypertension
SARS	sudden acute respiratory syndrome
SLE	systemic lupus erythematosus
STH	somatotropin (growth hormone)
subcu, Sub-Q, subQ	subcutaneous (injection)
T_3	triiodothyronine
T_4	tetra-iodothyronine
TFT	thyroid function test
TH	thyroid hormone
TSH	thyroid- stimulating hormone
Ung	ointment
USS	ultrasound scan
WBC	white blood cell
WNL	within normal limits; white neutrophil lymphocyte
XP, XDP	xeroderma pigmentosum